

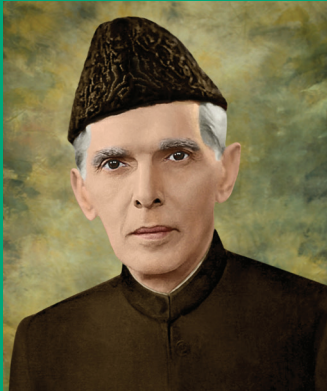
CPEC - Prospects and Challenges for Agriculture in Pakistan

(VISION-2025)

**Faisalabad Chamber of Commerce & Industry
Faisalabad, (Punjab) Pakistan**

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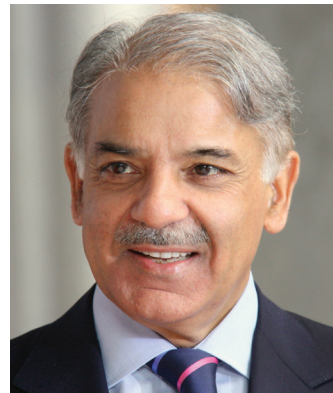
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Philosopher & National Poet
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Disclaimer

All information provided in this report is obtained from the secondary sources believed to be reliable and in all cases the reference has been quoted. While every effort is made to ensure that the information in this report is accurate, FCCI does not accept any legal or financial responsibility for any inaccuracy or omission whatsoever.

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The study was planned and executed at FCCI, on the advice of the Standing Committees on R&D and CPEC, keeping in view the national interests of Pakistan to strengthen the agriculture sector through CPEC. The study took a lot of efforts, planning, and hard work for its successful completion, within a very short duration of time. This report would not have been completed effectively without the cooperation of some notable experts from national level agricultural research/academic institutions, acknowledgement of whom is due on the authors.

The support was channeled down and materialized through untiring efforts from the experts of the following listed organizations:

- **Faisalabad Chamber of Commerce & Industry (FCCI):**
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Before the final synthesis of this report, it was decided to share findings with the academic experts from Institute of Business Management Sciences (IBMS) and Office of Research, Innovation and Commercialization (ORIC) UAF. Their expert advice helped in refining the ideas of this study.

Research Team

Preface

The China-Pakistan Economic Corridor (CPEC), with an investment portfolio of over \$55 billion, is a landmark project in the economic history of Pakistan that has been widely tipped to be a game changer, not only for Pakistan, but for the whole of South Asia. However, it can only become a game changer if all sectors of our economy work hard to capitalize on the opportunities provided by CPEC.

Since becoming the Vice President of FCCI last year, I have directed the CPEC cell at our R&D Department to carry out extensive research on CPEC to analyze the potential opportunities and challenges it poses for our economy. Our research team associated with the CPEC cell has carried out an in depth analysis of the CPEC project, under the guidance of our CPEC Standing Committee and has collaborated with various government departments at the federal and provincial level for the purpose of information sharing. Our CPEC cell published its first study report on this important topic in March this year entitled 'CPEC: Opportunities and Challenges' which was shared with government departments, academia, research institutes, and the business community. The report received much appreciation and helped in increasing public awareness regarding this important project.

This report, is the next in line of research being carried out by our CPEC cell. It focuses specifically on the agriculture sector of Pakistan and attempts to analyze the opportunities and challenges in CPEC for the agriculture sector in particular.

Agriculture is one of the most important sectors for developing agro-based economies like Pakistan. The sector has continued to play an important role in the national economy, since the country's formation in 1947. In the last financial year, it accounted for 19.8% of the national GDP, employing around 43% of the total labor force. From the last two decades, however, the performance of this key sector has been declining, coming down from 44% of the national GDP in the 1960s. The contribution by the agriculture sector to national economic growth has also been declining. The sector is facing various structural issues including low government spending on agriculture, lack of certified seeds, use of traditional farming methods, insufficient storage capacity, lack of value addition, poor supply chain management etc.

The multibillion dollar CPEC project provides hope for achieving sustainable growth in the agriculture sector. This report attempts to analyze in detail the opportunities in CPEC for the agriculture sector of Pakistan in particular. Based on the analysis, we have given policy recommendations under a 'Vision 2025', for achieving sustainable development in the agriculture through CPEC.

The analysis and recommendations given in this report, provide key insights for policy makers in the agriculture sector, both at the national and provincial level. By increasing agricultural exports only, Pakistan can become one of the top 40 countries in the world by exports, and improve its GDP growth significantly. We are hopeful that this report will turn out to be valuable for policy makers as well as agricultural entrepreneurs; helping to revive this important sector of our economy.

Engr. Ahmad Hassan
Chairman,
Standing Committees on R&D
& CPEC

List of Abbreviations

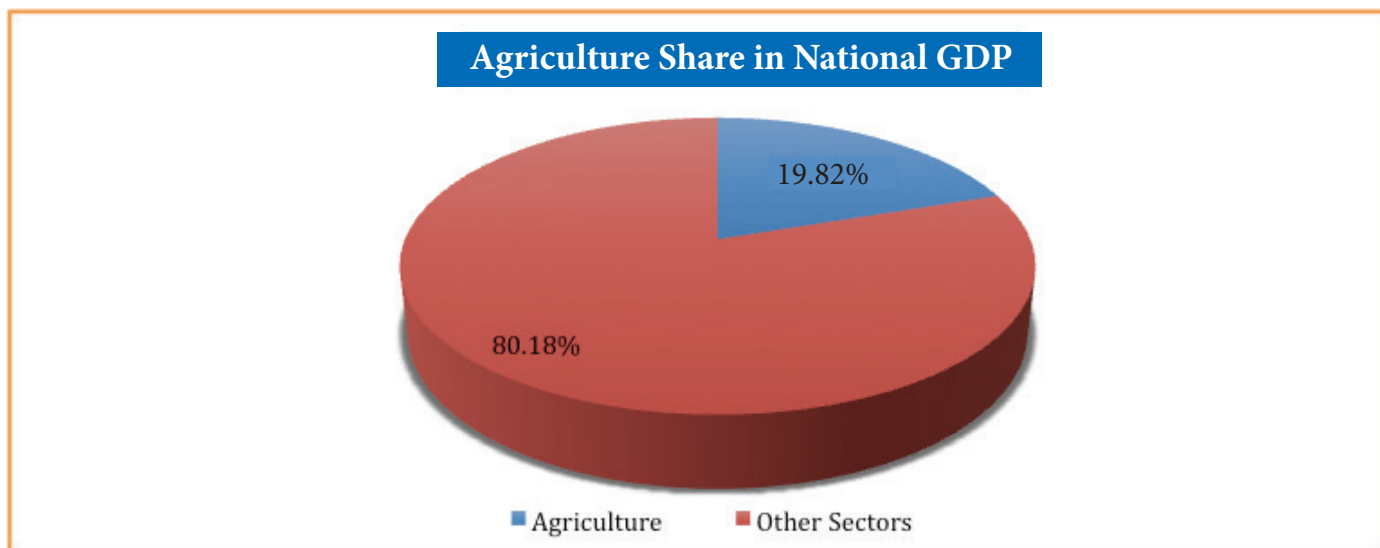
AARI	Ayub Agricultural Research Institute
AI	Artificial Insemination
AMIS	Agriculture Market Information System
CA	Cluster Analysis
CPEC	China-Pakistan Economic Corridor
EU	European Union
EV	Export Value
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FCCI	Faisalabad Chamber of Commerce and Industry
FSC&RD	Federal Seed Certification & Registration Department
FY	Fiscal Year
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GOP	Government of Pakistan
HACCP	Hazard Analysis and Critical Control Points
ISO	International Organization for Standardization
JCC	Joint Coordination Committee
KPK	Khyber Pakhtun Khwah
NARC	National Agriculture Research Corporation
NIAB	Nuclear Institute of Agriculture and Biology
NIBGE	National Institute of Biotechnology and Genetic Engineering
NDRC	National Development and Reform Commission
OBOR	One Belt One Road
OECD	Organization for Economic Cooperation and Development
PASSCO	Pakistan Agricultural Storage Services Corporation
PARB	Punjab Agriculture Research Board
PBS	Pakistan Bureau of Statistics
PHDEC	Pakistan Horticulture Development and Export Company
IBIS	Indus Basin Irrigation System
PKR	Pakistani Rupee
PLDDB	Pakistan Livestock and Dairy Development Board
PSMA	Pakistan Sugar Mills Association
SBP	State Bank of Pakistan
SCM	Supply Chain Management
SOP	Standard Operating Procedures
SPS	Sanitary and Phyto-Sanitary
TBT	Technical Barriers to Trade
TDAP	Trade Development Authority of Pakistan
UAF	University of Agriculture, Faisalabad (Pakistan)
UN	United Nations
UNDP	United Nations Development Program
USA	United States of America
USDA	United States Department of Agriculture
VCM	Value Chain Management
WTO	World Trade Organization

Chapter-1

AGRICULTURE IN PAKISTAN-AN OVERVIEW

AGRICULTURE IN PAKISTAN-AN OVERVIEW

Agriculture is the lifeline for agro based economies like Pakistan, which has been blessed countries with abundant resources and especially favorable environment for all types of agriculture including farming, fishing, forestry, and livestock.



Source: Pakistan Bureau of Statistics (2015-16)

1.1 CONCEPTS AND DEFINITIONS ABOUT AGRICULTURE

CROPS:

There are mainly two types of crops:

- **Major Crops**

Refers to a crop grown on more than 300,000 acres, for which the pesticide use pattern is limited so that the cost of registering the pesticide is lesser than revenues from the expected sales.

- **Minor Crops**

Refers to a crop grown on fewer than 300,000 acres

- Main Product (It includes all production of crop except husk etc.)
- By Product (It includes glumes and all types of husk)

Minor and major crops are further subdivided into seasonal crops:

Pakistan has two crop seasons -

- **Kharif Crops and Season**

Sowing season begins in April-June and harvested during October-December.

Rice, sugarcane, cotton, maize, moong, mash, bajra, and jowar are 'Kharif' crops.

- **Rabi Crops and Season**

Sowing season begins in October-December and harvested during April-May.

Wheat, gram, lentil (masoor), tobacco, rapeseed, barley and mustard are 'Rabi' crops.

Classification of crops w.r.t duration:

- **Temporary Crops**

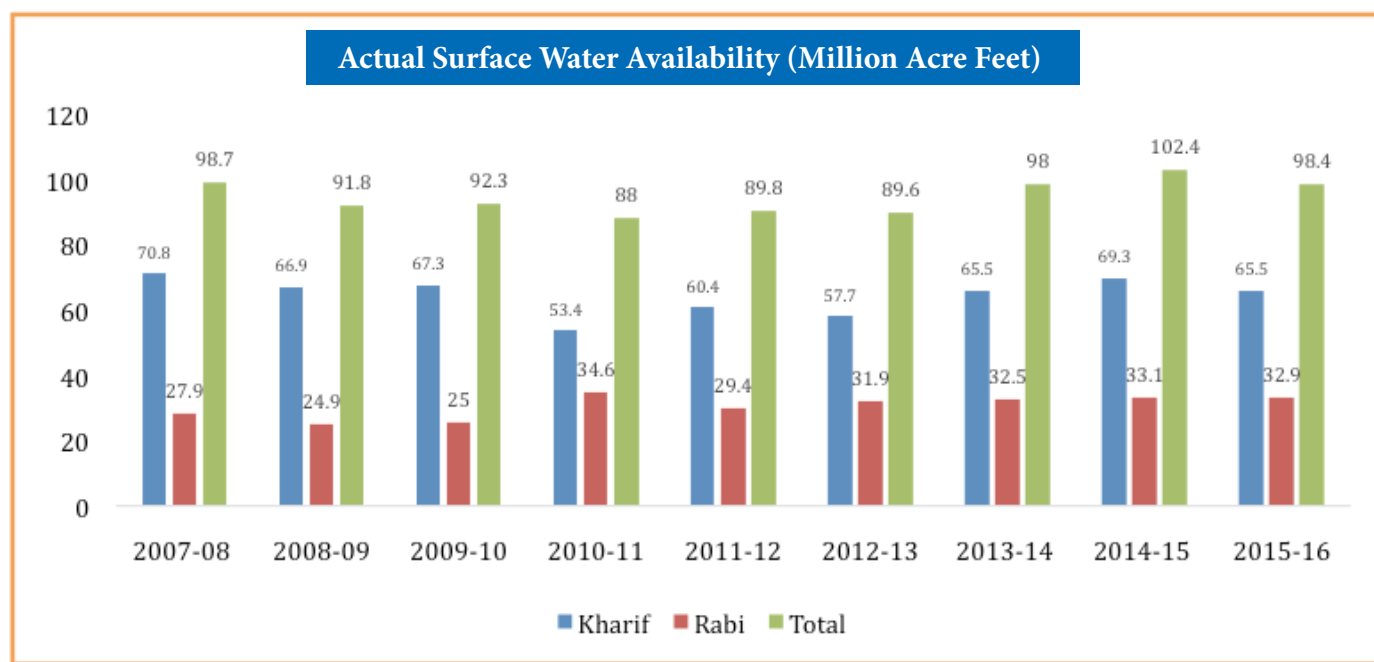
Temporary crops include crops with a less than one-year growing cycle and which must be newly sown or planted for further production after the harvest.

- **Permanent Crops**

Permanent crops include long-term crops which do not have to be replanted for several years, e.g. land under trees and shrubs producing flowers such as roses & jasmine; nurseries.

Water Measurements:

Pakistan's agricultural output is closely linked with the availability of irrigation water. During FY 2015-16, the availability of water for Kharif crops stood at 65.5 million acre feet (MAF) showing a decrease of 5.5 percent as compared to FY 2014-15 and 2.4 percent less than the normal supplies of 67.1 MAF. During the Rabi season 2015-16, the water availability remained at 32.9 MAF, which was 0.6 percent less than the availability in FY 2014-15 and 9.6 percent less than the normal availability of 36.4 MAF.



Source: Indus River System Authority (2015-16)

Classification of Meadows and Pastures:

- Temporary Meadows and Pastures**

It is the land temporarily cultivated with herbaceous forage crops for mowing or pasture. A period of less than five years is used to differentiate between temporary and permanent meadows.



- Permanent Meadows and Pastures**

Permanent meadows natural grass land used for grazing, and pastures is the land used permanently (more than 5 years) to grow herbaceous forage crops.

Area can be defined in following ways:

- Area Sown**

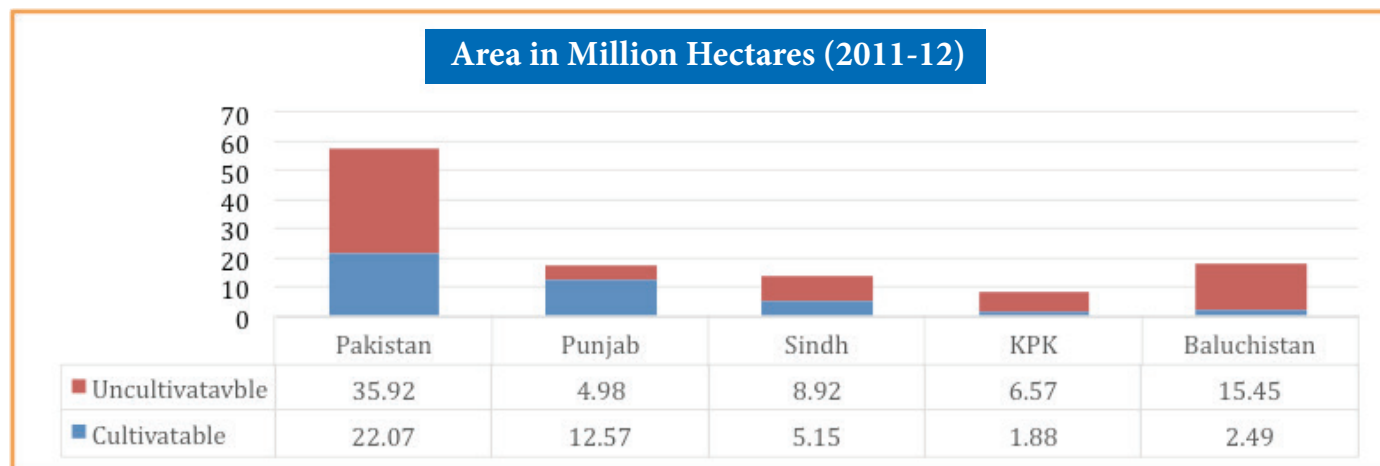
Refers to the area on which sowing or planting has been carried out, for the crop under consideration, on the soil prepared for that purpose.

- Land Area**

Refers to the total land area excluding area under inland water bodies.

Land Area = Agricultural Area + Forest Area + Other wooded land + Other Land

Land Utilization Statistics of Pakistan (Total Area Reported):



Source: Provincial Agriculture Department (2011-12)

- **Agricultural Area**

Agricultural Area = Arable land and Permanent crops + Permanent meadows and pastures

- **Arable Land**

Arable Land = Temporary crops + Temporary meadows & pastures+ Fallow land (temporary: less than 5 years).

- **Other Land**

The land not classified as Agricultural land, Forest area and other wooded land. It includes built-up and related land, barren land etc.

Note: China has 15 percent arable land, with an increase of 4 percent annually.

Production quantity of Primary Crops:

Refers to the actual harvested production from the field or orchard and gardens, excluding harvesting and threshing losses and the part of crop not harvested for any reason.

- **Area Harvested**

Refers to the area from which a crop is gathered. Area harvested, therefore, excludes the area from which, although sown or planted, there was no harvest due to damage, failure, etc.

- **Agricultural Area Irrigated**

Agricultural area irrigated = Temporary crops irrigated + Temporary meadows and pastures irrigated + Permanent crops irrigated + Permanent meadows & pastures (Cultivated and irrigated)

Markets in Punjab:

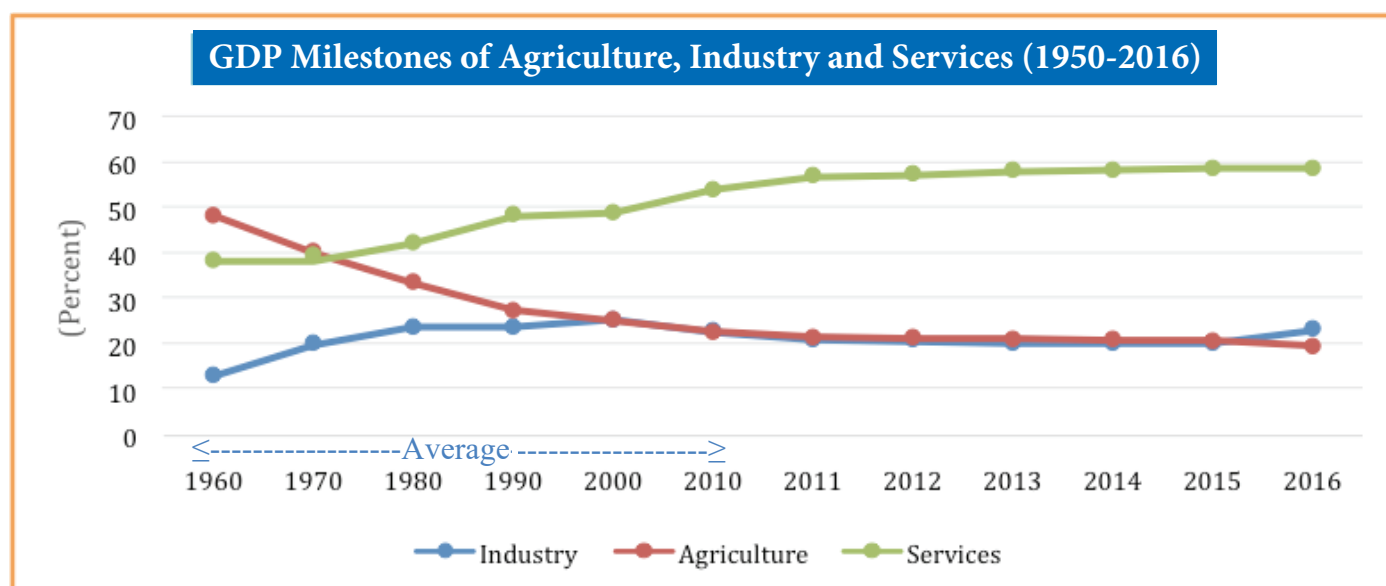
Agricultural produce markets are notified places by the government for the sale and purchase of agricultural commodities such as fruits, vegetables, and grains. Currently, there are 244 agricultural markets in Punjab for grains, fruits and vegetables. Besides these there are 81 feeder markets to feed the main agricultural produce markets. The details of these markets in Punjab are given below.

S.No	Type of Market	Nos.
1	Grain Markets	149
2	Fruits and Vegetables Markets	95
3	Feeder Markets	81
	Total	325

Source: Provincial Agriculture Department

1.2 A HISTORICAL PERSPECTIVE OF AGRICULTURE IN PAKISTAN

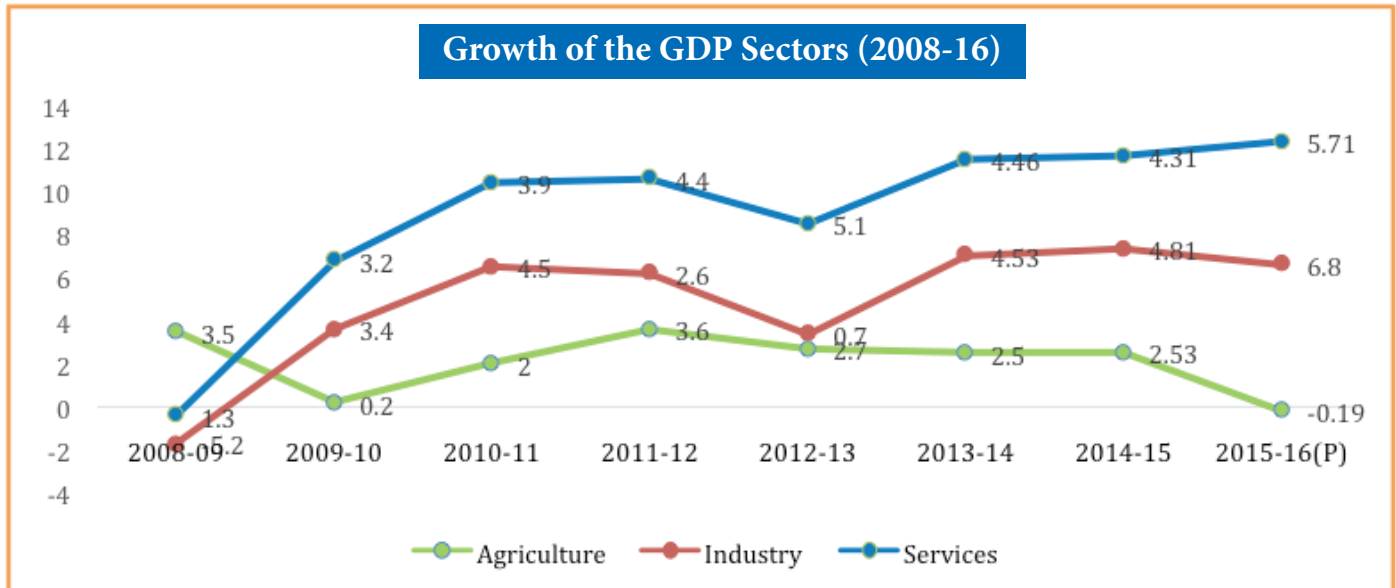
The Agriculture sector has strong links with the rest of the economy, which are unseen in statistics. It is the primary supplier of raw materials to many downstream industries that contribute significantly to Pakistan's exports while also being the largest market for various manufactured goods such as pesticides, fertilizers, tractors, and other agricultural equipment. In this section, we provide a historical statistical overview of the agriculture sector of Pakistan, and its contribution to the economy. We also analyze trends in the prices of agricultural commodities. The macroeconomic impacts of these commodity prices are important because they affect the level of per capita income, which ultimately is a key determinant of living standards for individuals and families (FAO, 2011).



Source: Pakistan Bureau of Statistics

Historical Growth of the major GDP Sectors:

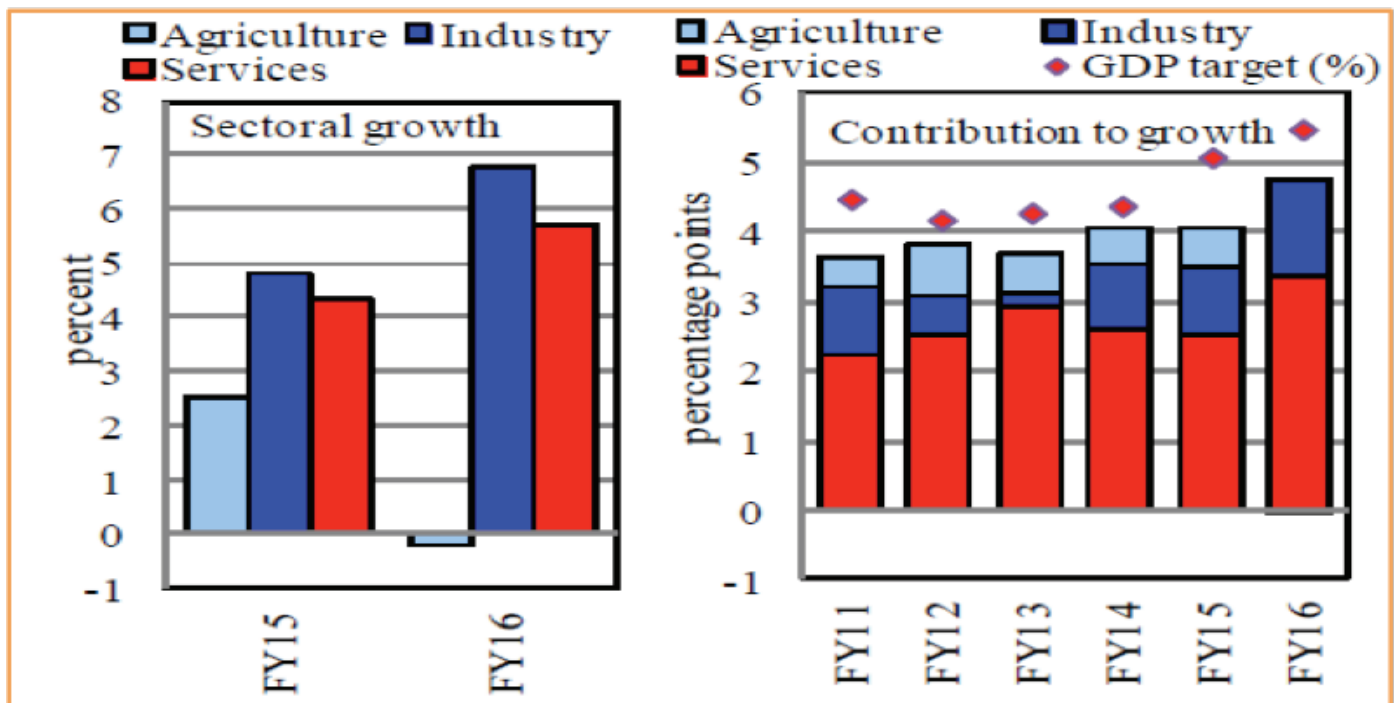
The Agriculture sector recorded negative growth of -0.19 percent against the growth of 2.53 percent last year. The agriculture growth stood at 2.53 percent during July-March, 2014-15 as compared to 2.7 percent during the previous year.



Source: Economic Survey of Pakistan (2015-16)
P: Provisional

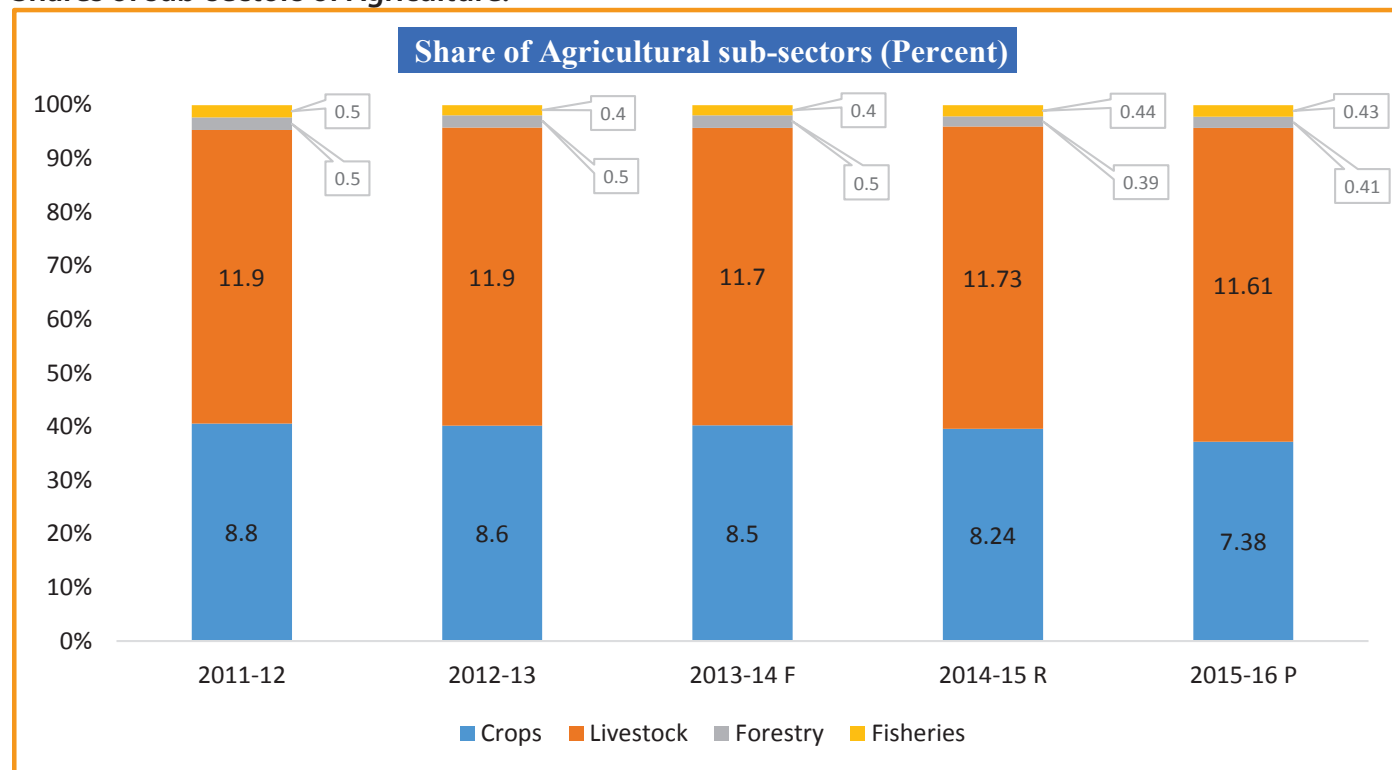
Note: Agriculture and Industry are the commodity producing sectors of the economy

GDP Growth and Sectoral Contribution:



Source: SBP-Annual Report, Pakistan Bureau of Statistics (2015-16)

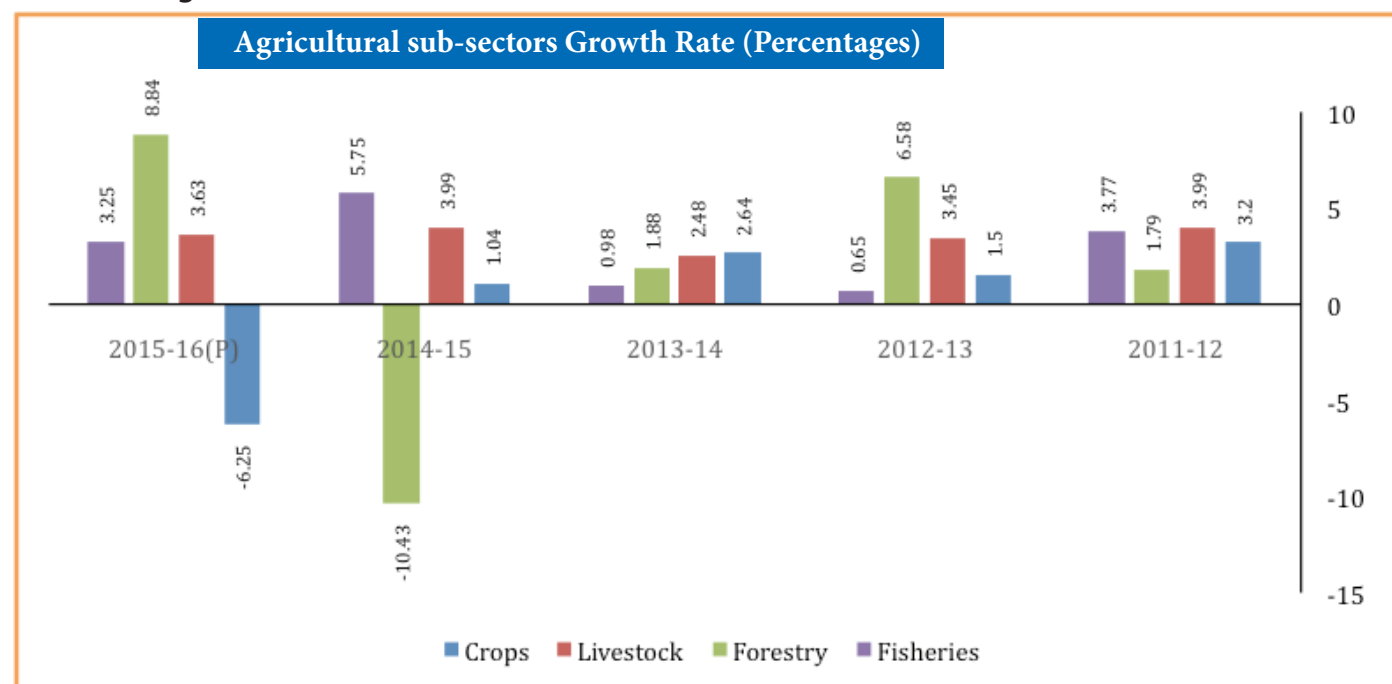
Shares of sub-sectors of Agriculture:



F: Final, R: Revised, P: Provisional

Source: Pakistan Bureau of Statistics (2015-16)

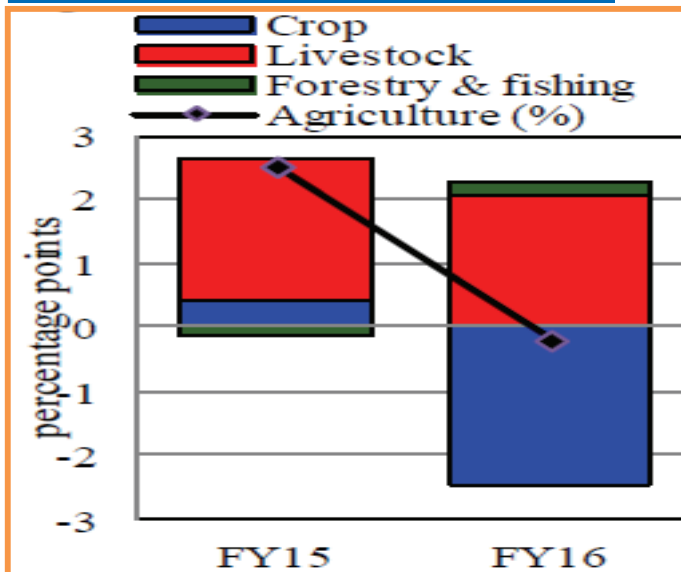
Growth of Agricultural sub-sectors:



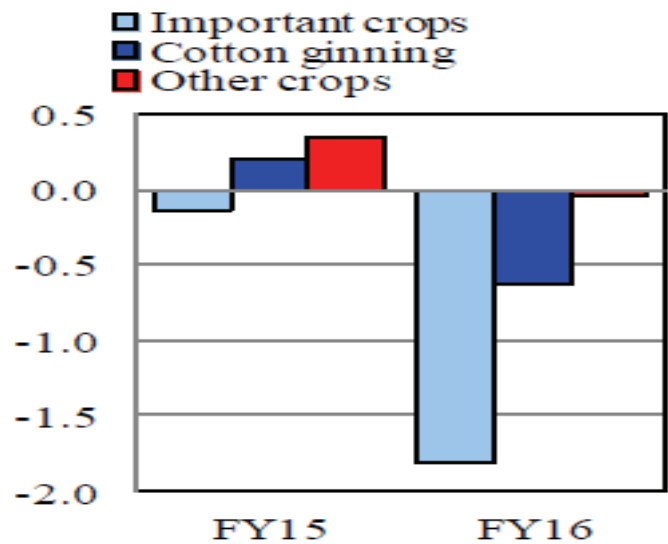
Source: Pakistan Bureau of Statistics (2015-16)

P: Provisional

Contribution to Agricultural Growth



Contribution from Crop Sector

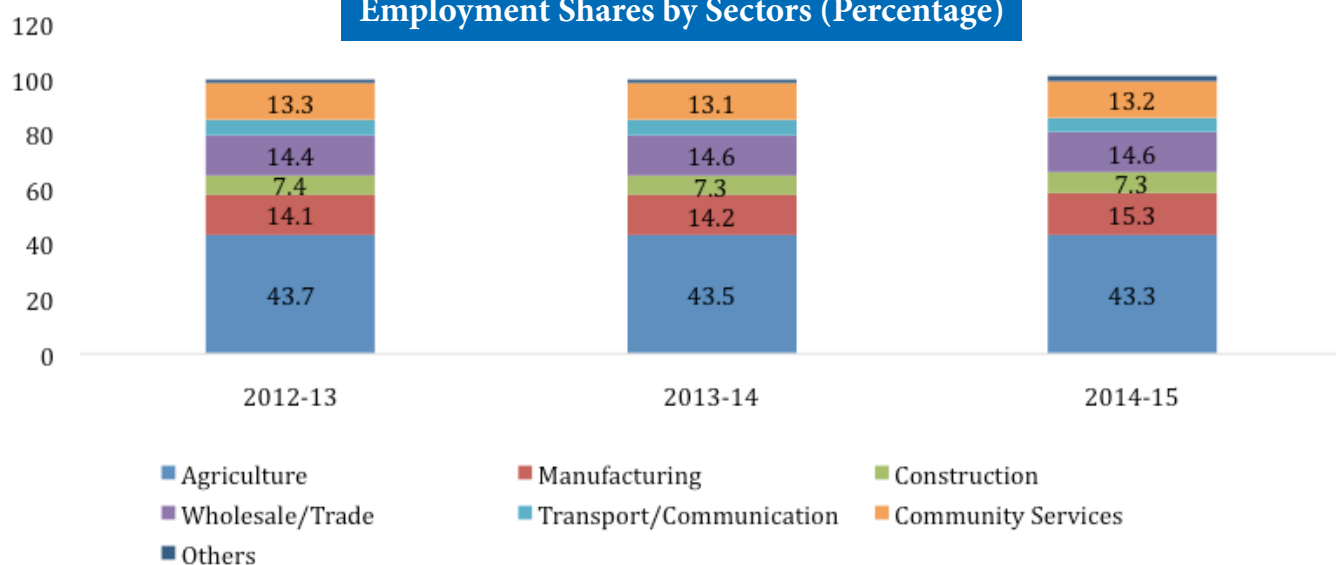


Source: SBP-Annual Report, Pakistan Bureau of Statistics (2015-16)

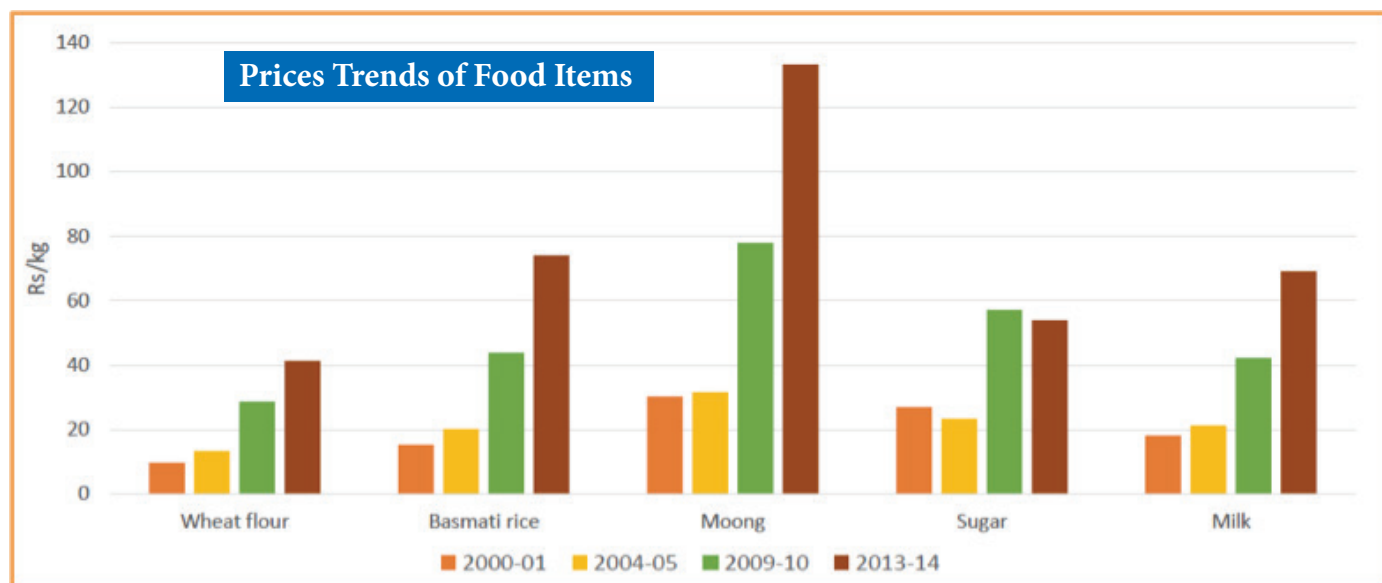
Sectoral Performance

The Agriculture sector has been the strength of Pakistan's economy, since independence. It was the dominant sector in early years, but its performance has declined gradually, due to the political, social, environmental, and climate issues which have led to a decrease in average yield. However, the sector still contributes a significant 19.82 percent to the national GDP, engaging almost 43 percent of the country's total labor force (GOP-2016).

Employment Shares by Sectors (Percentage)

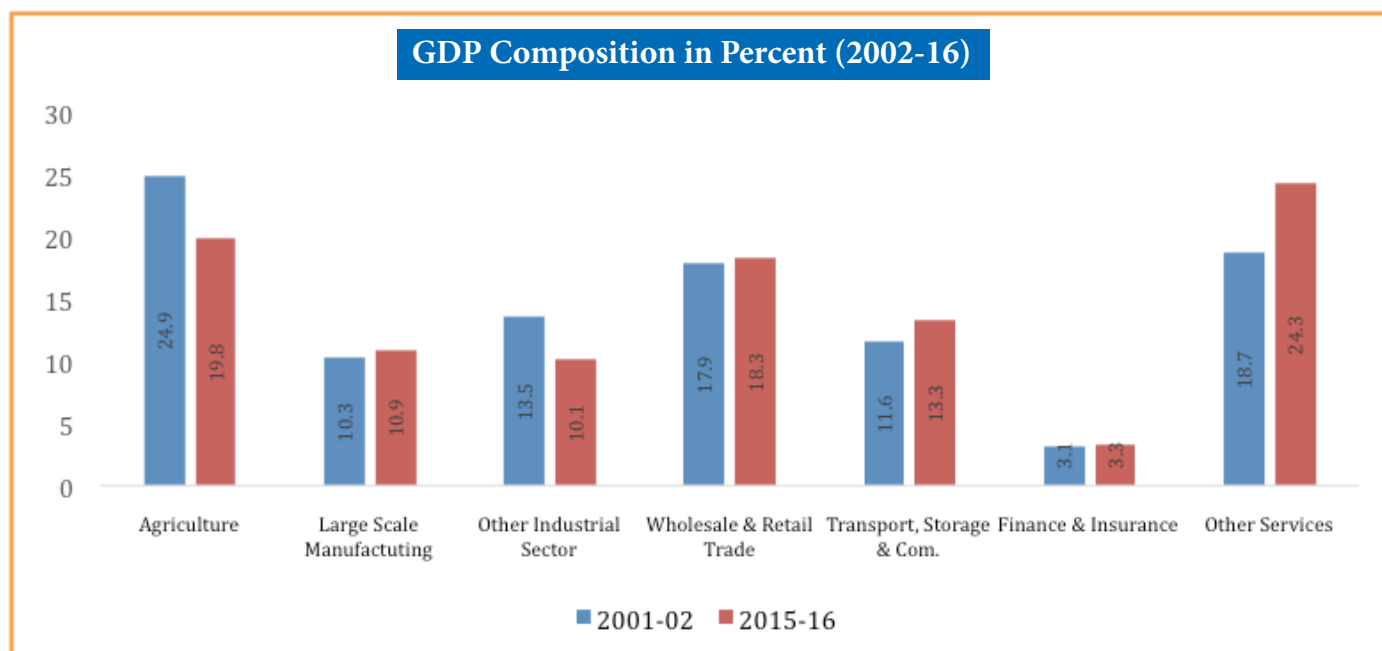


Source: Pakistan Bureau of Statistics (2015-16)



Source: Economic Survey of Pakistan

Sectoral Composition of GDP



Source: Economic Survey of Pakistan (2015-16)



1.3 ROLE OF AGRICULTURE IN THE ECONOMIC DEVELOPMENT OF PAKISTAN

Agriculture is of huge economic importance for Pakistan. In the initial years after independence, Pakistan was primarily an agro-based economy. Gradually, however, Pakistan turned into a more diversified economy, with the development of the manufacturing and services sectors. The agriculture still remains an important economic sector, and the role of agriculture in industrial development cannot be denied as well.

1.3.1 Source of National Income

Agriculture has a vital contribution towards the GDP of Pakistan. As mentioned earlier, the agriculture sector has contributed a significant share of the GDP since independence, accounting for more than 40% of the GDP in the 1960s, the share decreasing gradually to 19.8% in FY 2015-16. The agriculture sector now has the third largest share in the GDP of Pakistan.

1.3.2 Source of Employment

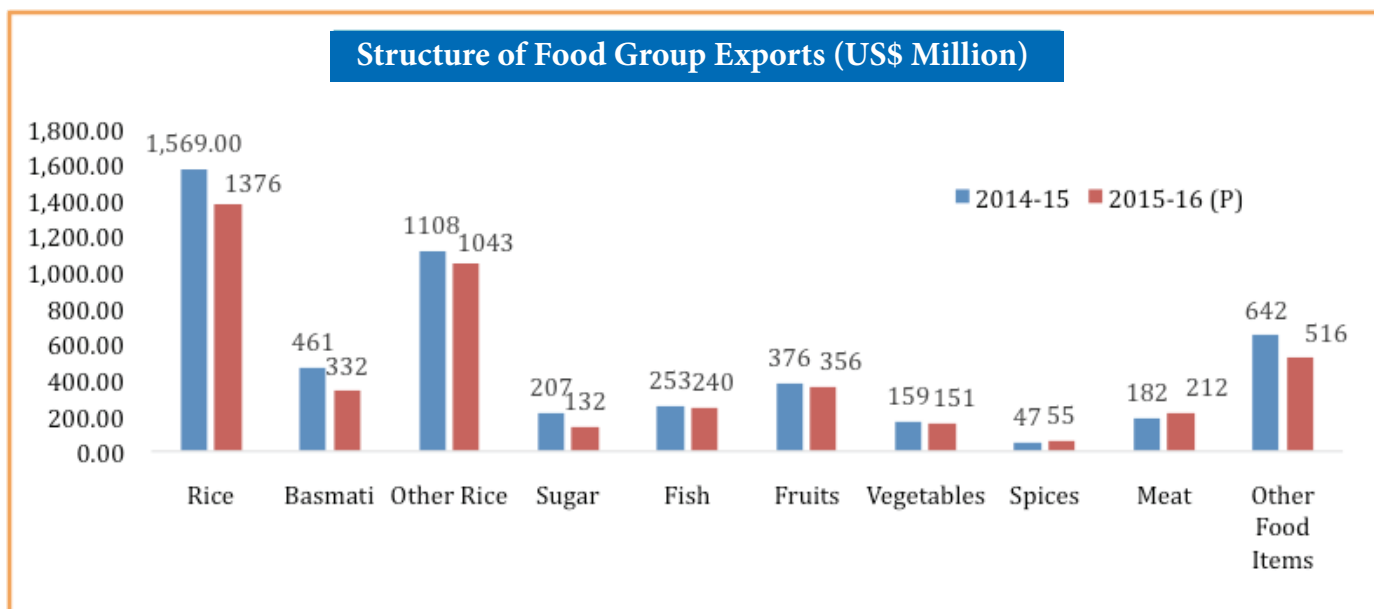
The Agriculture sector is the primary source of employment for Pakistan's labor force, employing 42.3 percent of the country's 65 million labor force. More than half of the population of Pakistan lives in rural areas. A 2007-08 development report by UNDP identified that 65% of the total population of Pakistan lived in rural areas in 2005. In rural areas agriculture is the sole means of income and employment. Agriculture also provides indirect employment to many people, engaged in manufacturing industries which are dependent on agriculture for raw material such as the textiles and leather goods industries of Pakistan.

1.3.3 Tax Revenue source for the Government

Economic development is one of the prime responsibilities of any government. The higher the government collects tax revenue, the greater the money it can spend on developmental projects. Agriculture helps the government by increasing its tax revenue. Agriculture provides raw material to many of the important industries of Pakistan, therefore, as agriculture expanded in the country, industrial activity also took hold. Expansion in industrial sector has also led towards increased tax revenue for the government from the industrial sector. In this way the agriculture has a significant contribution in the tax revenue of the government.

1.3.4 Contribution towards Exports

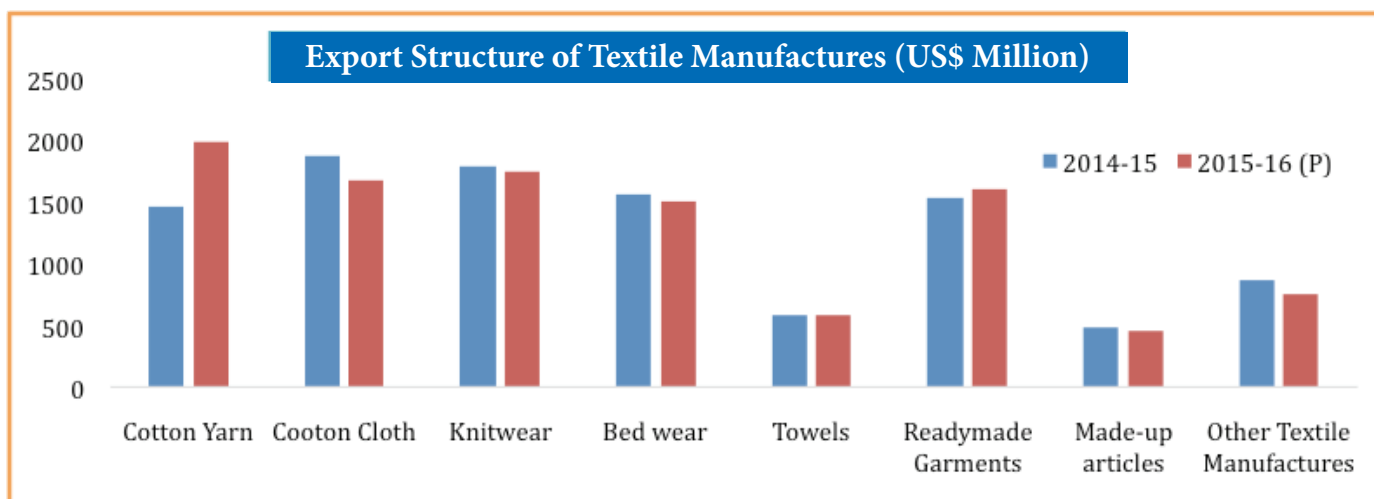
Major agricultural exports (food product exports standing at 19.48%) of Pakistan consist of agricultural items like cotton, rice, and wheat. According to FAO, Pakistan exports rice, cotton, fish, fruits, and vegetables to various countries around the world. However, a major share of Pakistan exports of Agriculture Commodities and Textiles Products have low value addition, which requires the attention of policy makers.



Source: Pakistan Bureau of Statistics (2015-16)

1.3.5 Source of Raw material for Industry

Agriculture is helping numerous industries in Pakistan by providing fresh natural raw material including the textiles, clothing, and leather industries. Cotton is a major cash crop of Pakistan and important for textiles and clothing exports.



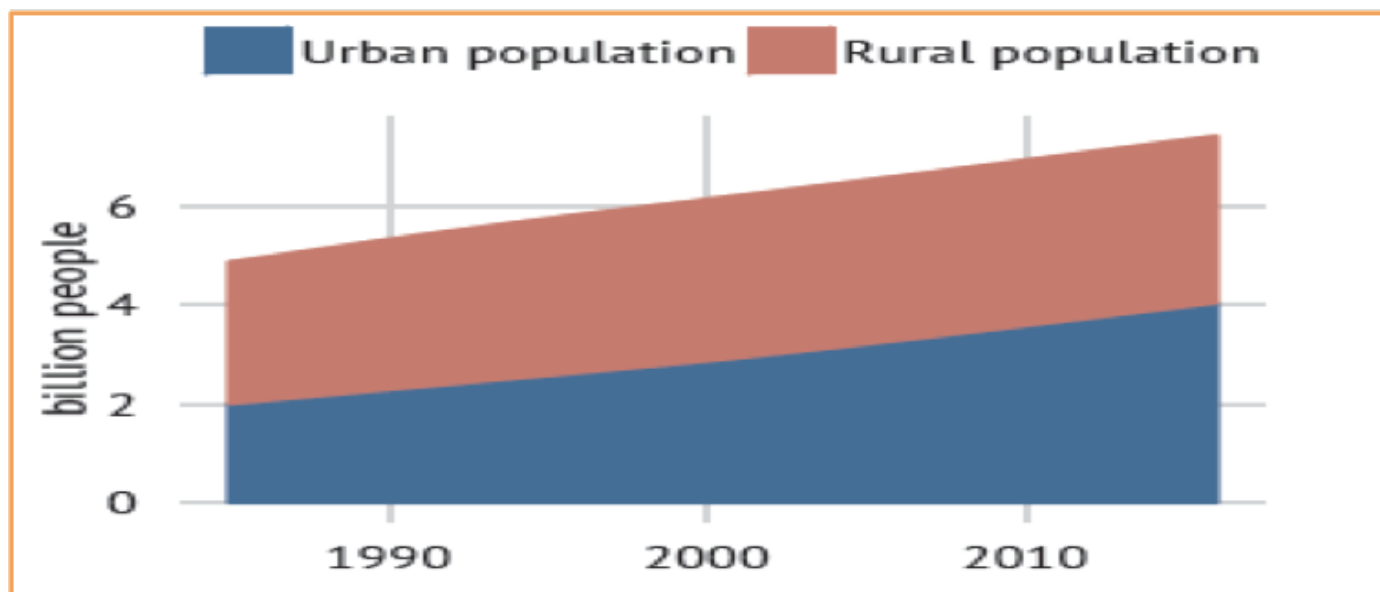
Source: Economic Survey of Pakistan (2015-16)

1.3.6 Livelihood for Rural Sector

As mentioned previously, almost 65% of Pakistan's population lives in the rural sector. Agriculture has been the primary reason for the advancement of the rural sector of Pakistan. It is

not only the means of subsistence for the villagers but is also the biggest source of employment for them.

World Rural and Urban population Trend (1985-2016)



Data after 2010 are Projections

Source: FAO-Statistical Pocketbook (2015)

1.3.7 Enlargement of Banking Services

Keeping in view the contribution of agriculture in villages and remote areas, the government has established banks for facilitating of the rural farming community. This initiative is supportive for the development of the national economy and provides a safe mode of transaction for the rural SMEs and agribusiness community. Agriculture Development Bank of Pakistan (ADBP) which is currently converted to Zara-i-Taraqati Bank Limited (ZTBL) is striving to improve access to finance for farmers. Many other commercial public/private banks have also opened up their branches in the rural sector to assist farmers by providing them with loans on feasible terms. These banks have been established with the aim to uplift the agriculture and rural sector by raising farm productivity, streamlining the institutional credit, and increasing income generating capacity of the farming community.

1.3.8 Infrastructural Expansion

Effective measures for agriculture will categorically add up to the improvement of the weak economy of Pakistan. Infrastructure is a fuel for economic development, which includes roads, transportation, law & order, mode of communications etc. Well managed infrastructure assures timely transportation of goods from the rural areas to urban areas. The infrastructure projects being developed under CPEC, have a high importance for the agriculture sector and through the development of this sector, CPEC can be made a true 'game changer' for the national economy.

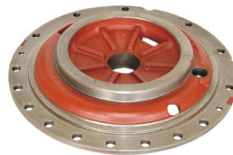
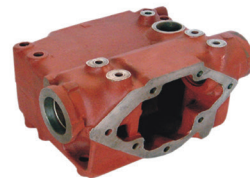
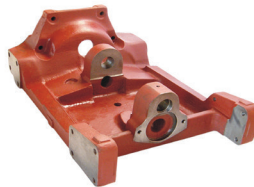
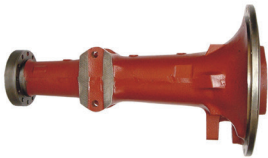
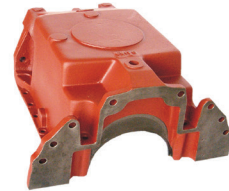
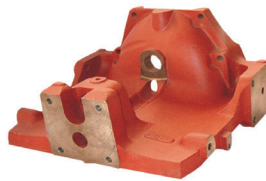
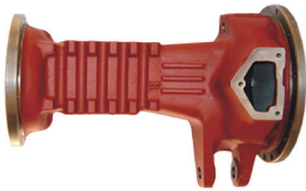


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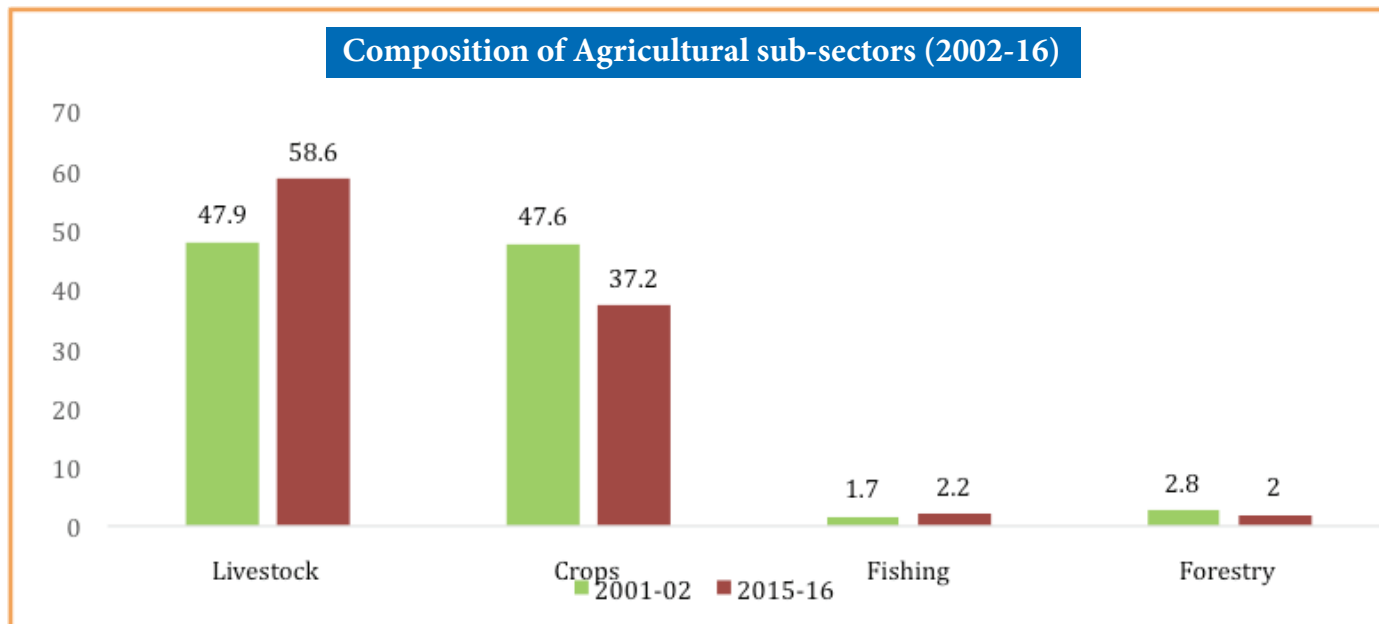


Chapter 2

STATISTICAL ASSESSMENT OF MAJOR CROPS

STATISTICAL ASSESSMENT OF MAJOR CROPS

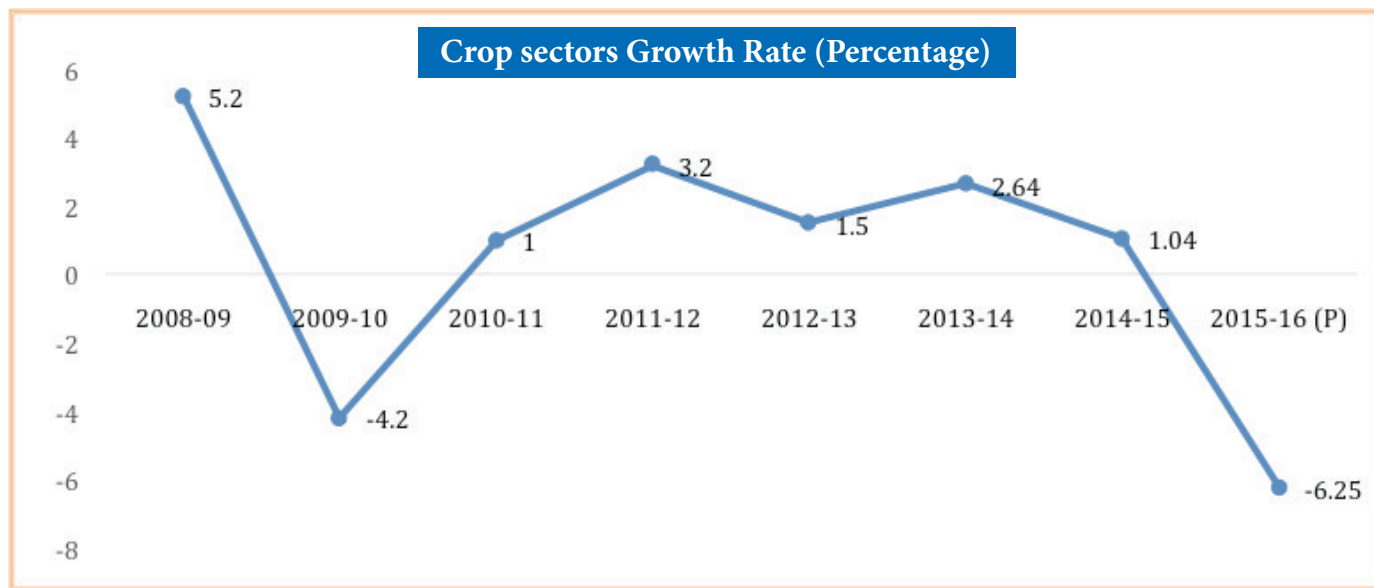
2.1 Comparison of Agricultural Sub-Sectors:



Source: Pakistan Bureau of Statistics (2015-16)
P: Provisional

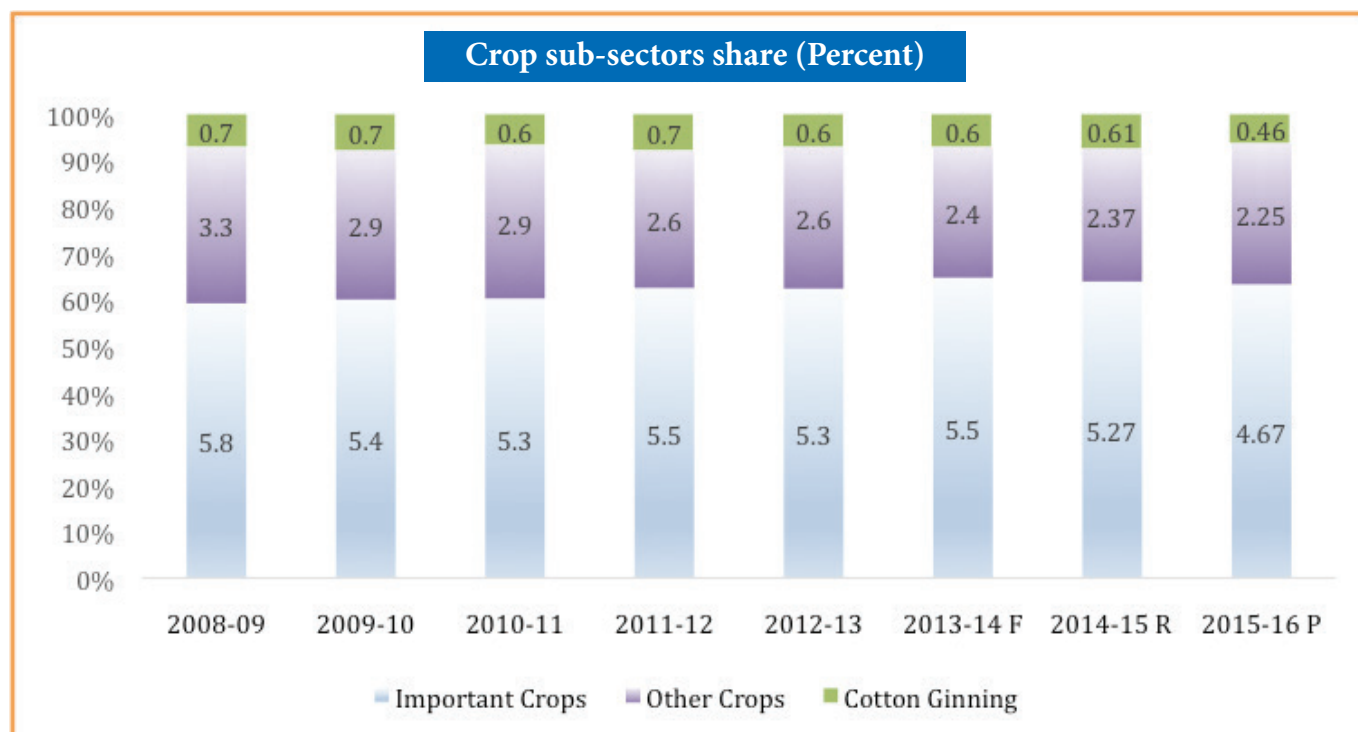
Agricultural Sub-sectors Growth Rate:

Crops:



Source: Pakistan Bureau of Statistics (2015-16)
P: Provisional

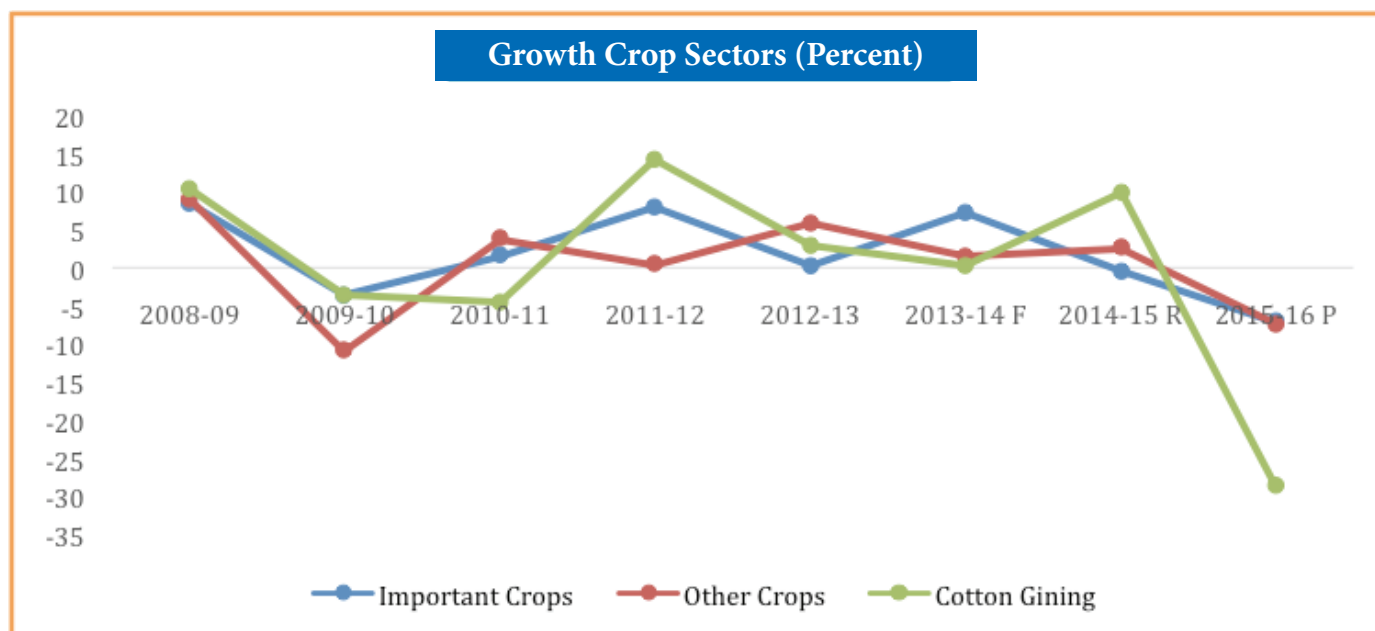
Sectoral share of Crops:



F: Final, R: Revised, P: Provisional

Source: Economic Survey of Pakistan (2015-16)

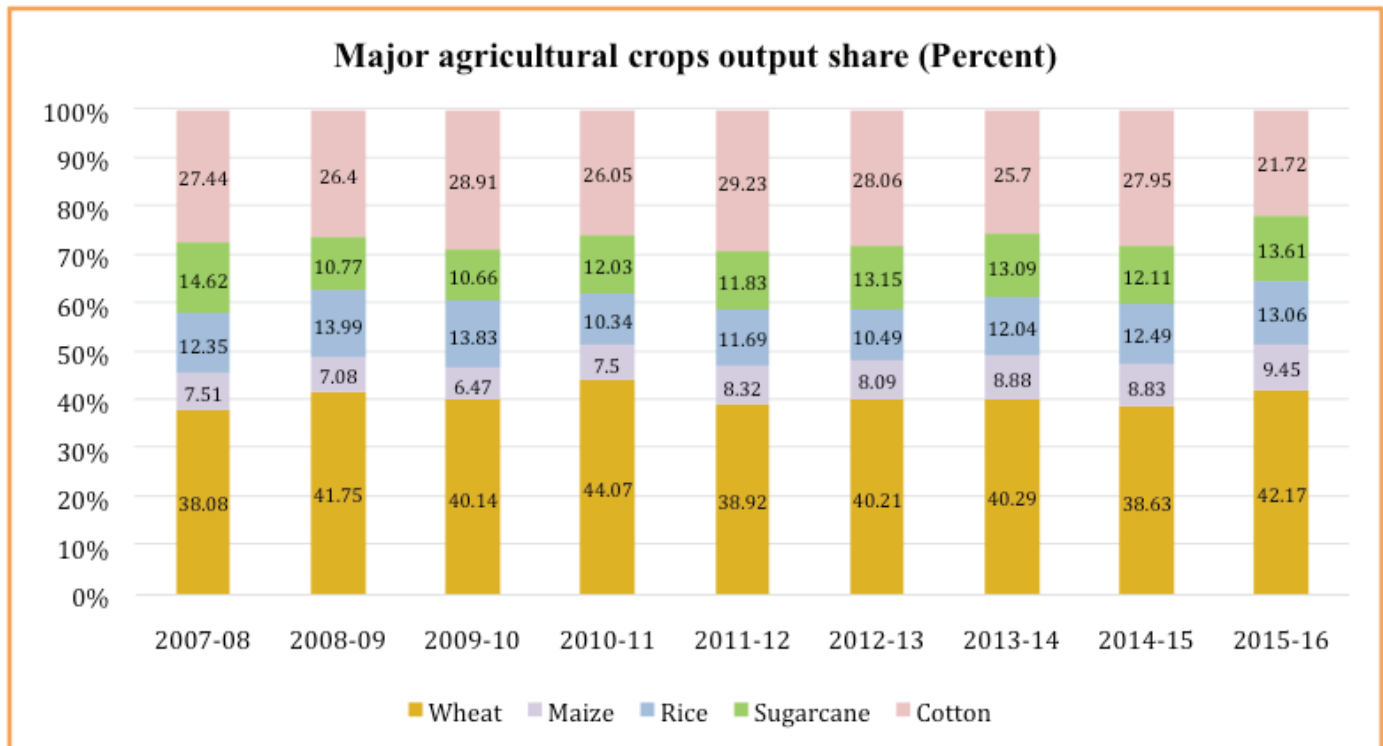
Growth Trend of Crops Sector:



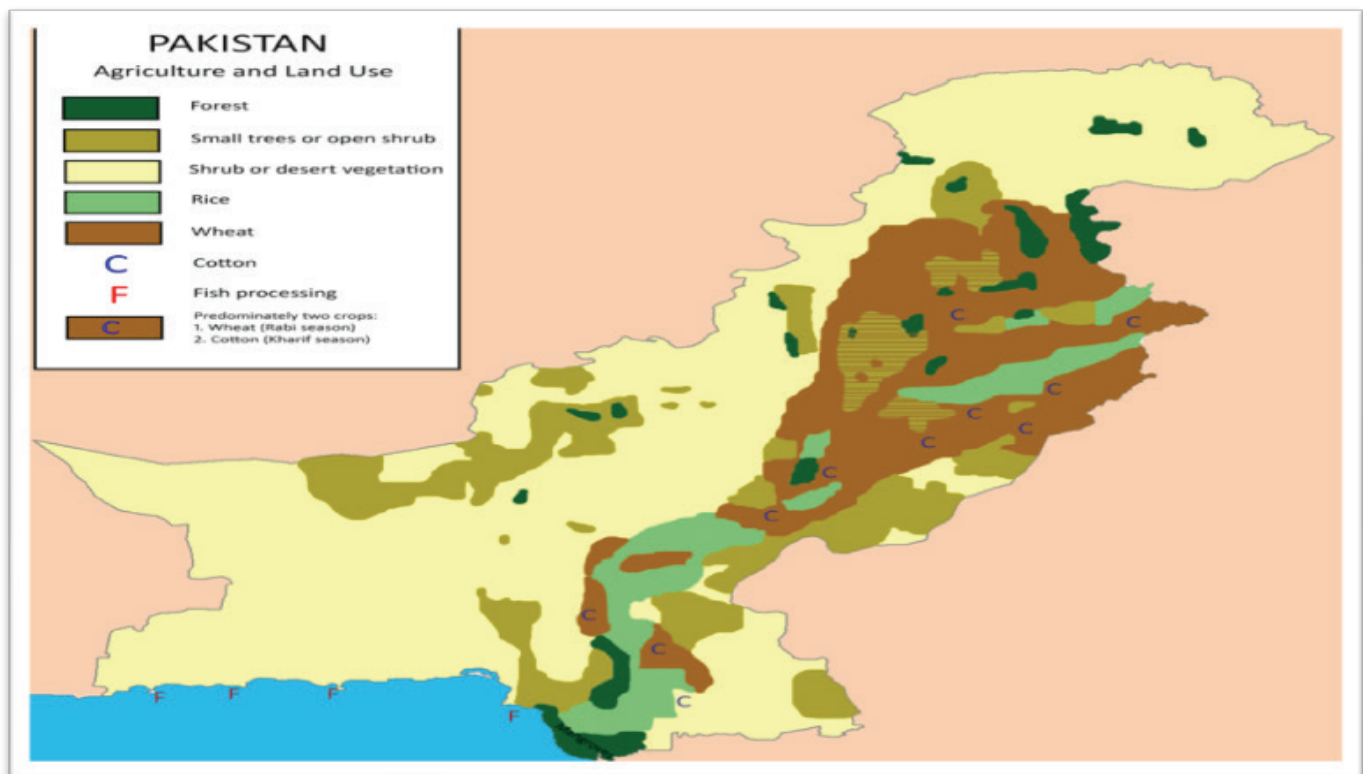
F: Final, R: Revised, P: Provisional

Source: Government of Pakistan, (2016)

Compositional Output of Major Important Agricultural Crops:



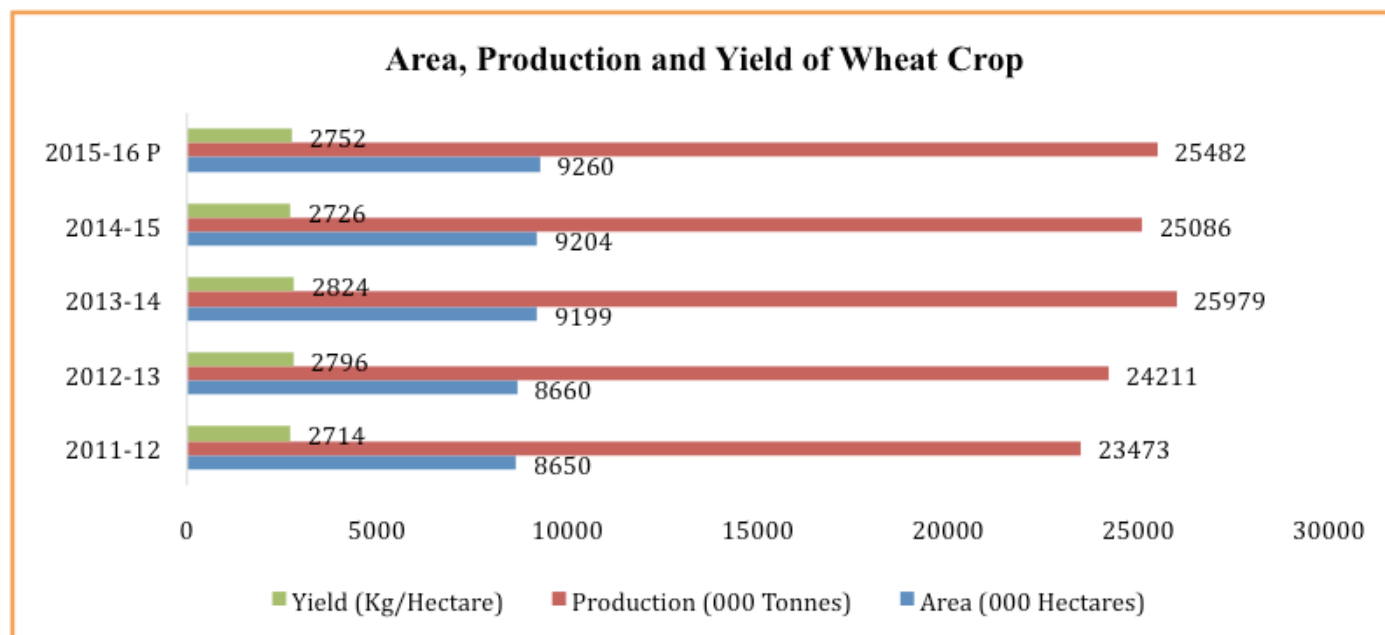
Source: Government of Pakistan, (2016)



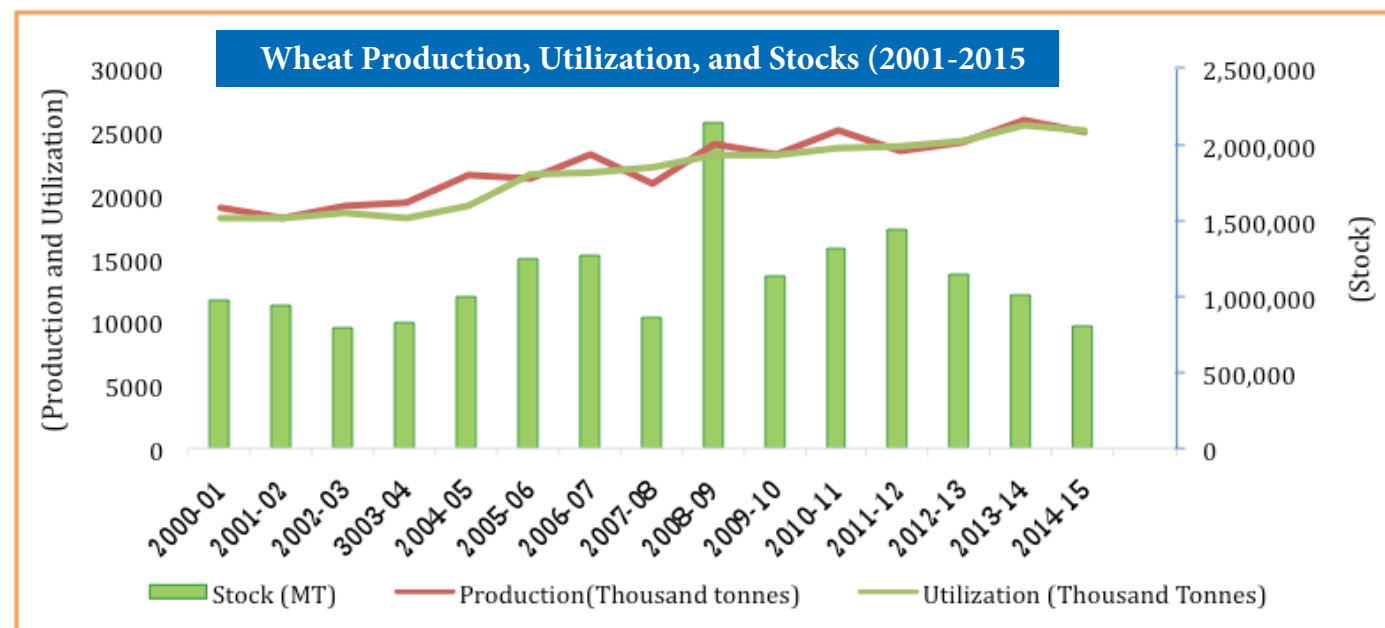
2.2 Major Crops Domestic and World Outlook:

2.2.1 Wheat Crop

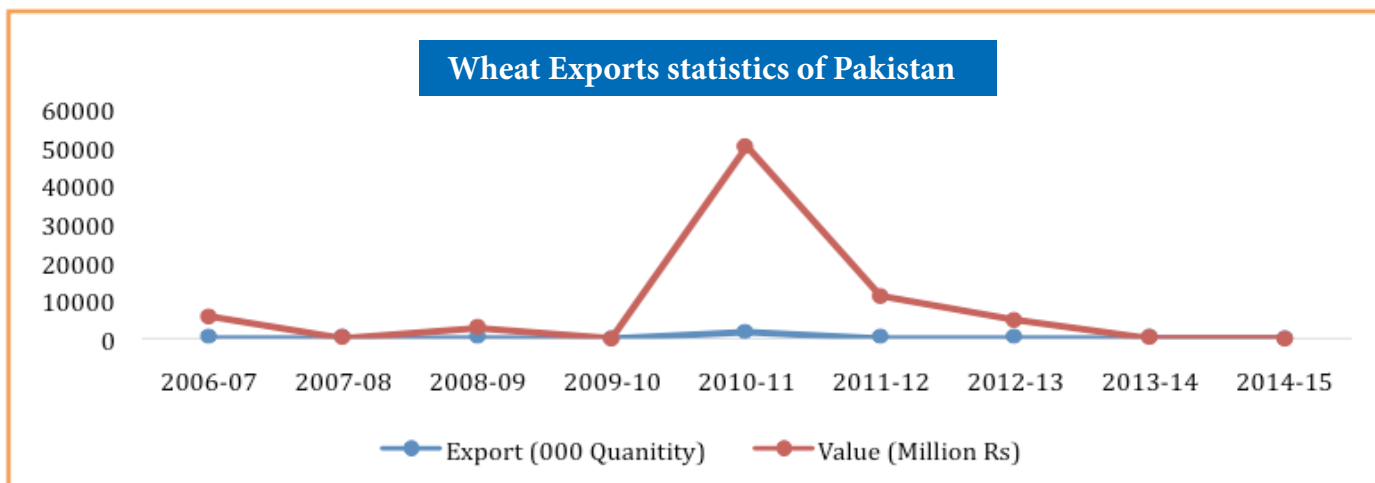
Wheat is the most popular food crop of Pakistan and it is used in a number of ways. Being the staple diet of most people, it dominates all crops in acreage and production. Wheat accounts for 9.9 percent of the value added in agriculture and 2.0 percent of the GDP of Pakistan, while only wheat production witnessed a positive growth of 1.58 percent as compared to last year.



Source: Pakistan Bureau of Statistics (2015-16)
P: Provisional (July- March)

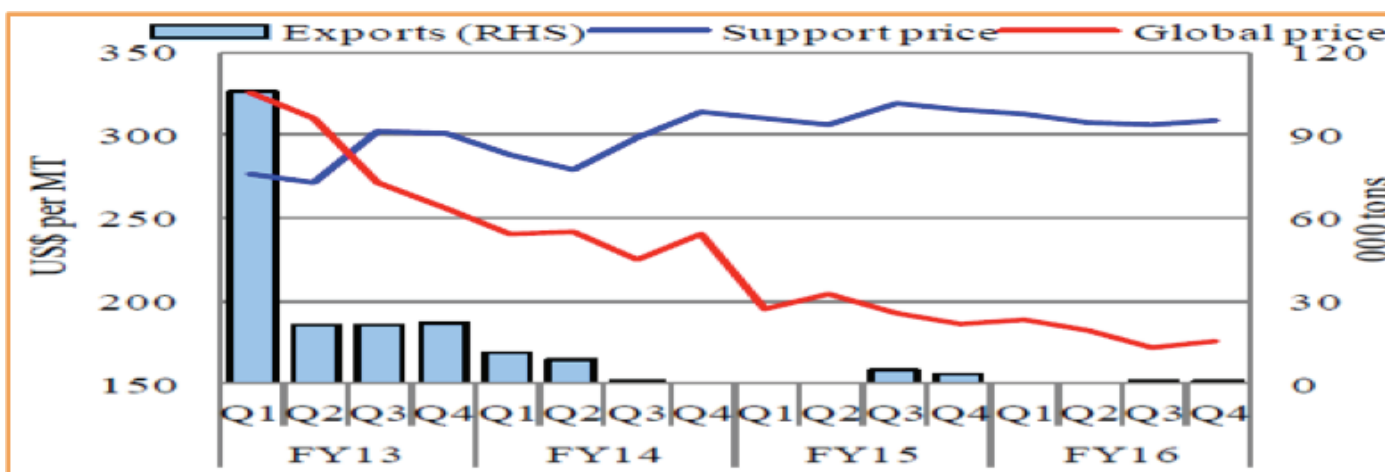


Source: PASSCO, Pakistan Bureau of Statistics, OECD-FAO (2015-16)



Source: Trade Development Authority of Pakistan (2015)

Wheat domestic/international Prices and Exports Statistics:



Source: Chicago Board of Trade, Pakistan Bureau of Statistics (2016)

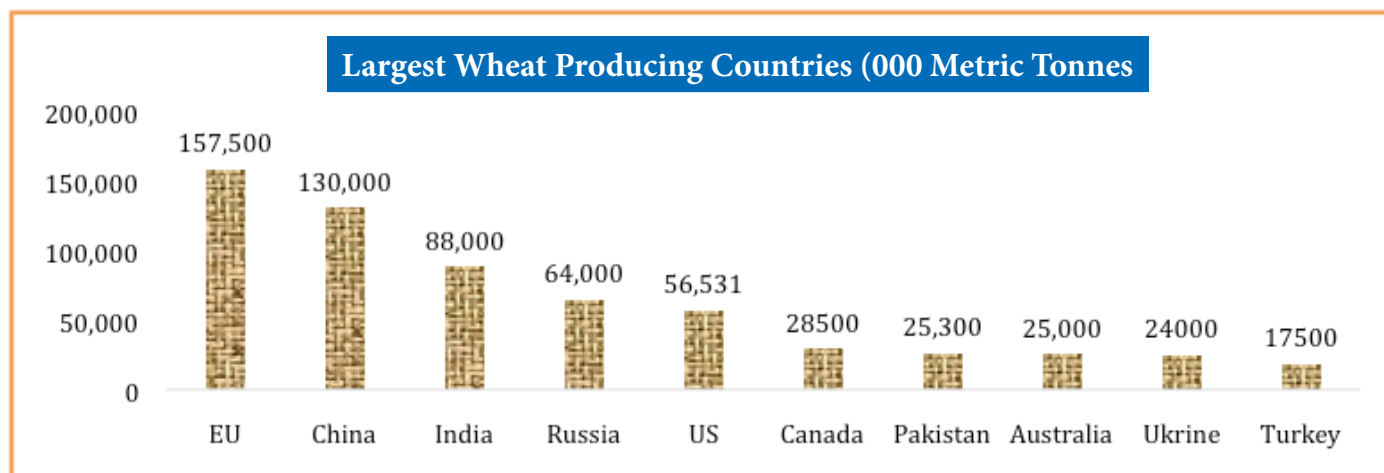
Note: International prices are decreasing continuously, in comparison to the prices of Pakistan. The govt. should focus on reducing cost of production to increase wheat and other agri-exports.



World Wheat Balance at a Glance (Million Tonnes):

	2014-15	2015-16
Production	729.8	734.1
Trade	155.6	154.5
Total Utilization	710.1	719.2
Food	485.7	491.4
Feed	138.1	140.3
Other uses	86.2	87.5
Ending Stock	201.8	210.6

Source: FAO-United Nations (2015-16)



Source: IFPRI (2015-16)

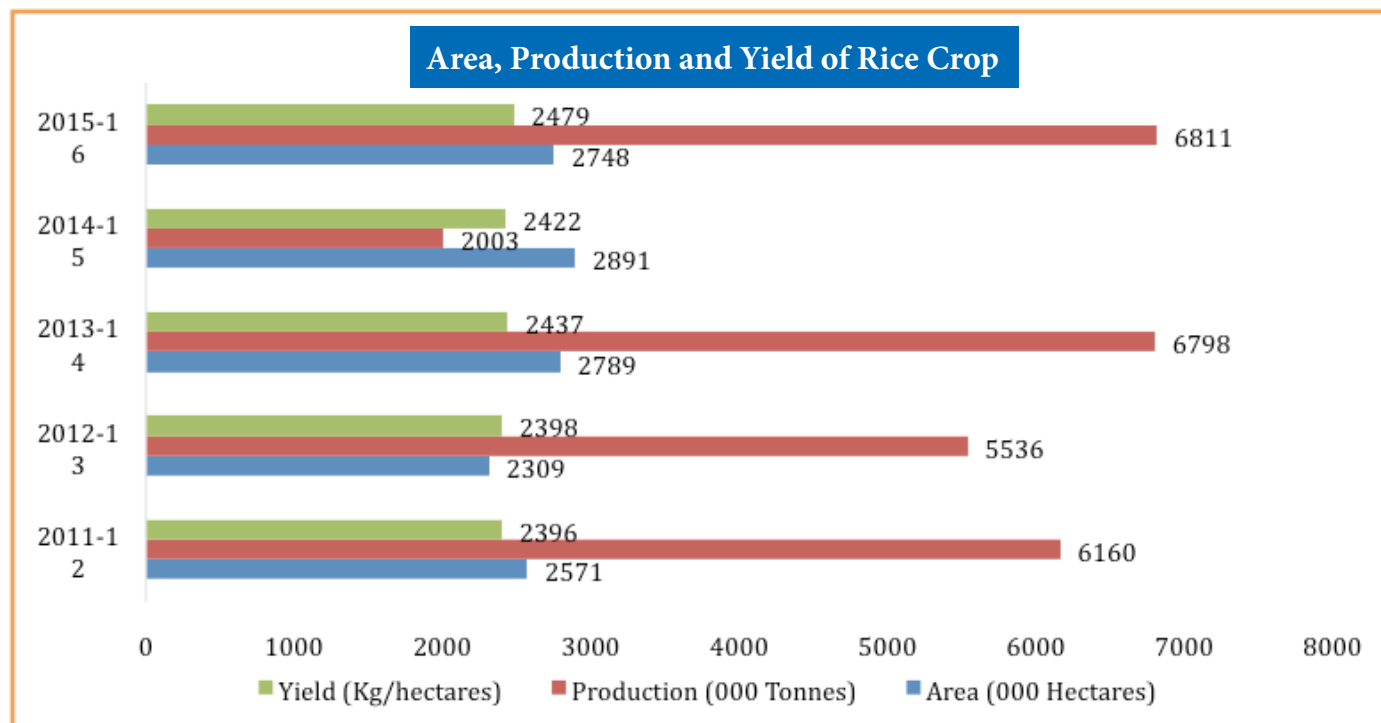
Benefits of Wheat:



- Boosts immune system
- Aids in cellular metabolism
- Rich in anti-aging properties
- Reduces risk of heart diseases
- Helps to prevent cancer and diabetes
- Beneficial in maintaining healthy muscles
- Helps to improve stamina and performance

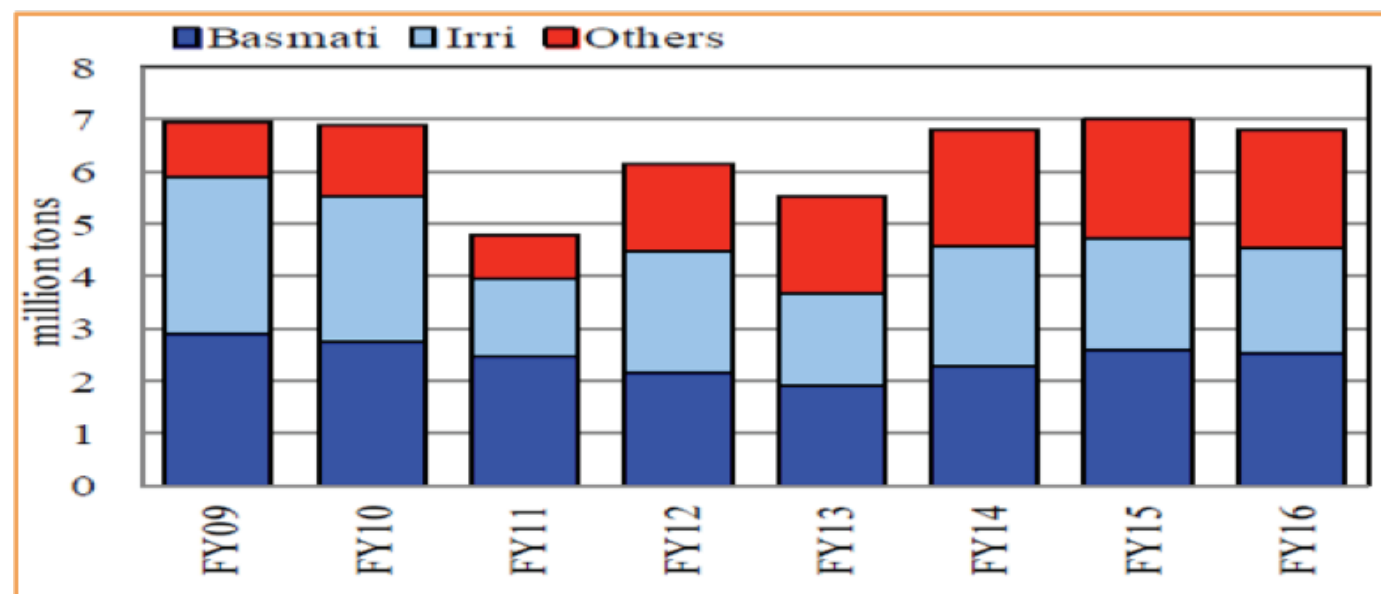
2.2.2 Rice Crop

Rice is an important food and cash crop grown in the Kharif season and it is the second staple food after wheat. It accounts for 3.1 percent in the value added in agriculture and 0.6 percent of national GDP (2015-16).

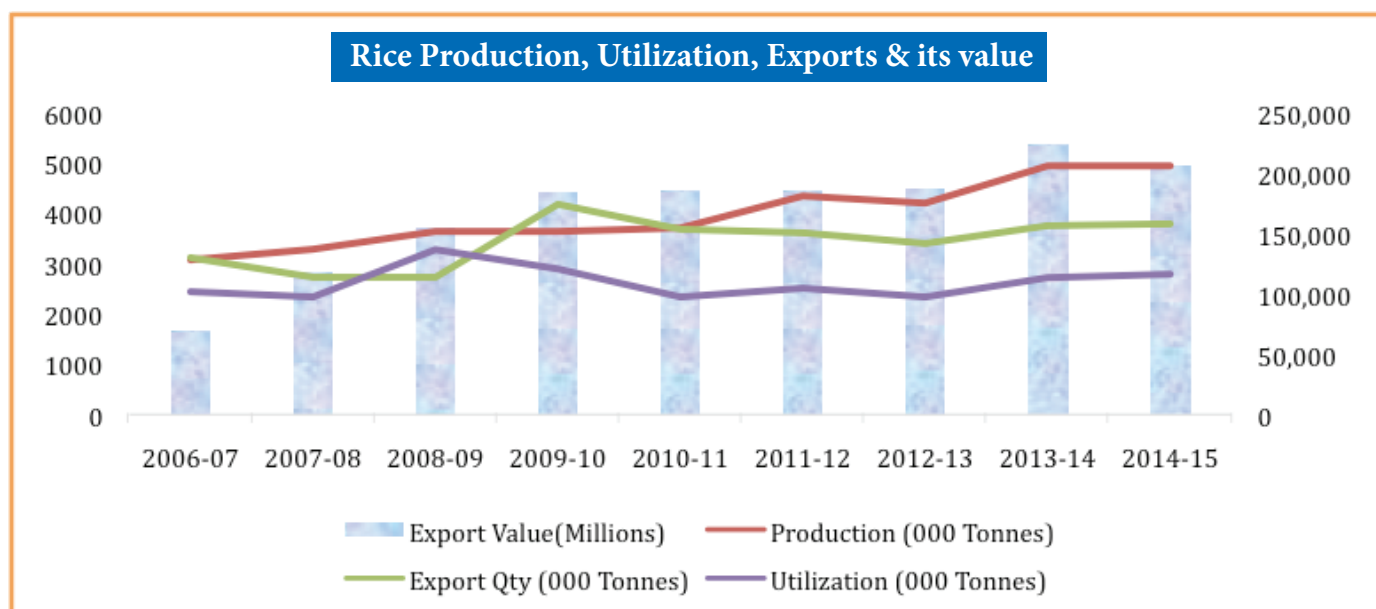


Source: Pakistan Bureau of Statistics (2015-16)
P: Provisional (July- March)

Rice Production in Pakistan:



Source: Pakistan Bureau of Statistics (2015-16)



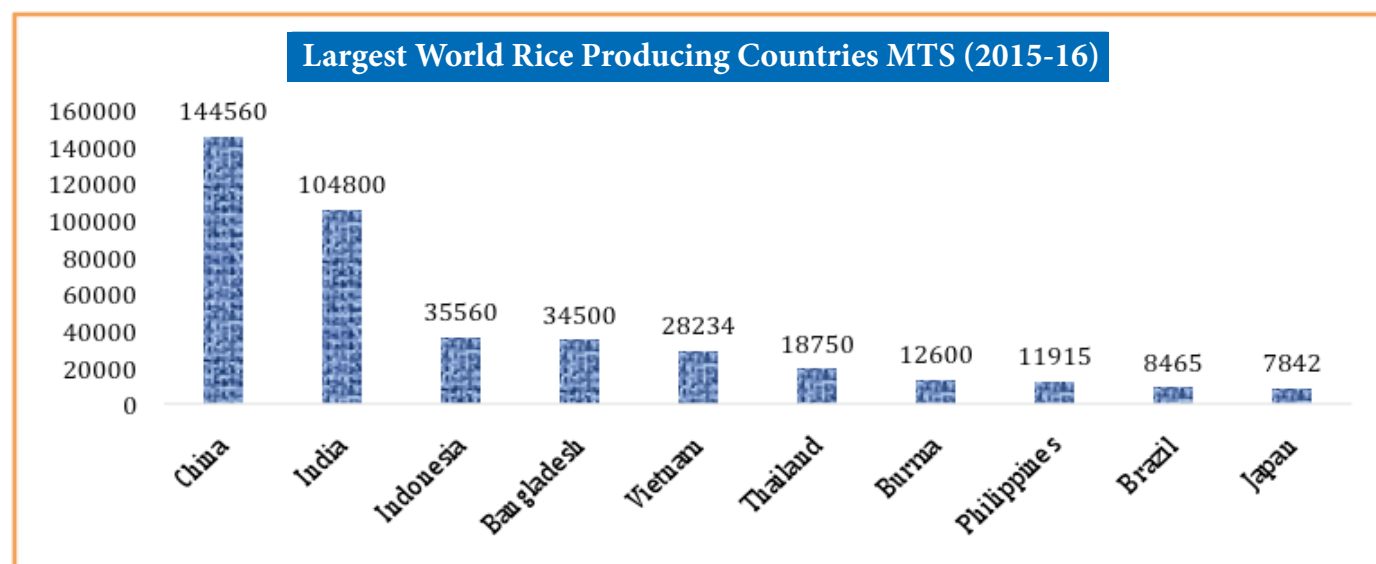
Source: Trade Development Authority of Pakistan, OECD-FAO (2015-16)

World Rice Balance at a Glance (Million Tonnes):

	2014-15	2015-16
Production	494.4	490.1
Trade	44.6	44.7
Total Utilization	491.5	496.4
Food	395.2	399.7
Ending Stock	173.9	168.9

Source: FAO-United Nations (2015-16)

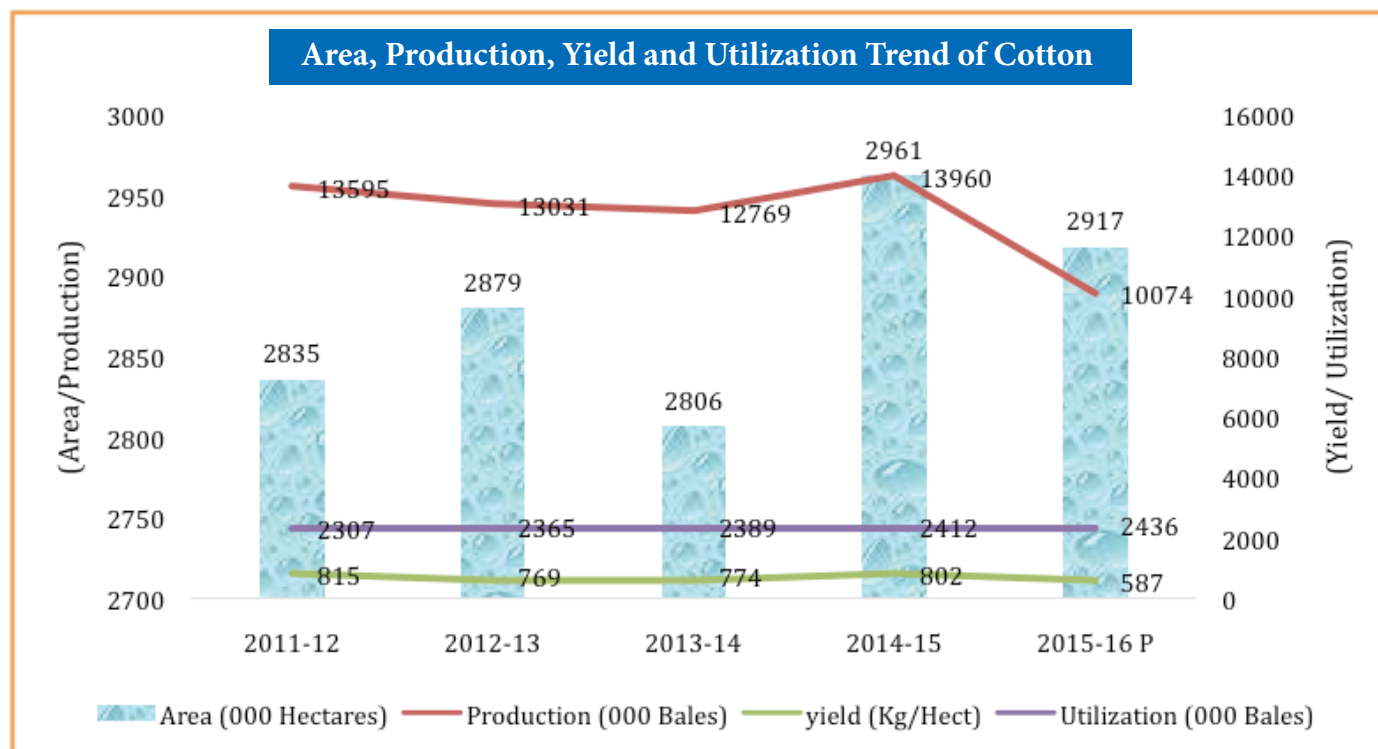
World Rice Production Outlook:



Source: United States Department of Agriculture (2015-16)

2.2.3 Cotton Crop

Cotton being a cash crop and an essential source of raw material for textiles, enables the textiles and clothing industry to survive and expand its base. Cotton has a share of 1.0 percent in national GDP and contributes 5.1 percent in agricultural value addition.

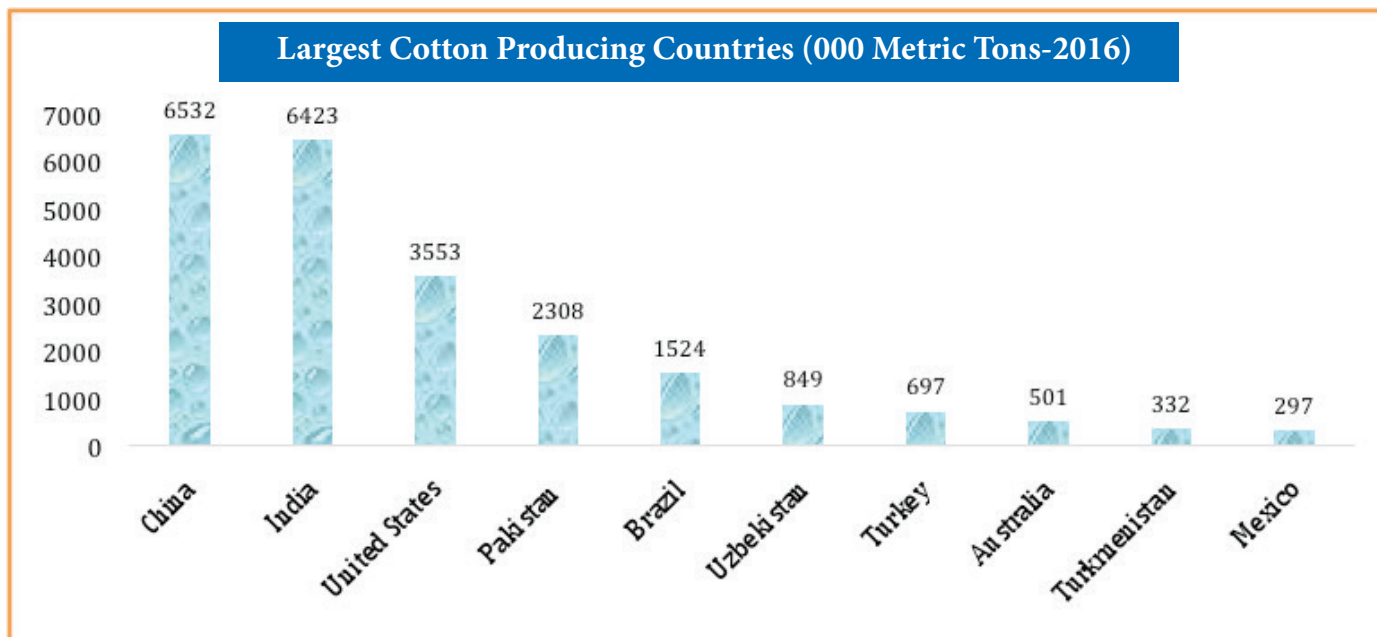


Source: Pakistan Bureau of Statistics (2015-16)
P: Provisional (July- March)

Cotton is grown in the Kharif season. The production of cotton decreased significantly in the last year. However, despite this drop in production, textiles and clothing exports contributed around US \$10.2 billion to the national income. The textile industry contributes approximately 9.5% in the country's GDP and being a labor-intensive industry, it is also the principal employment generating avenue in the large scale industrial sector. To maintain the supply chain of cotton to the domestic textile industry, raw cotton worth US\$ 588.236 million had to be imported in financial year 2015-16.

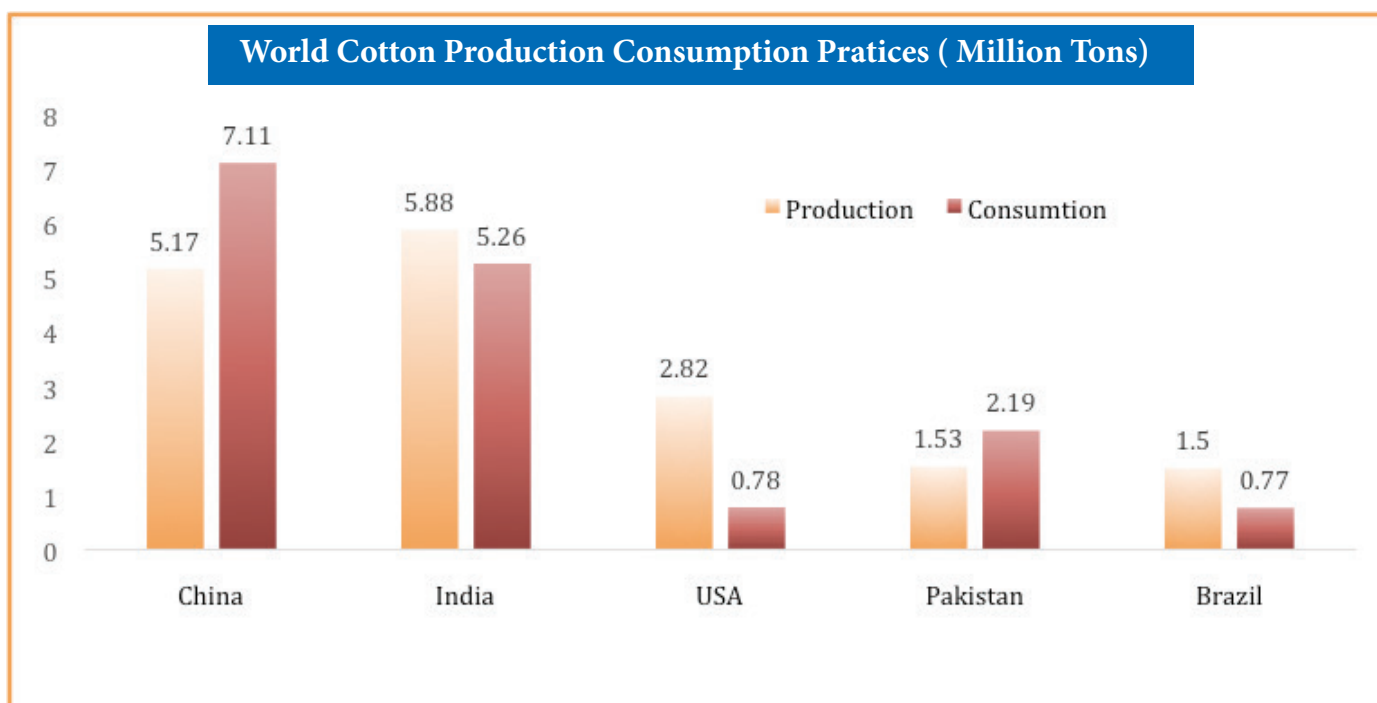
By following modern practices, and advanced technology, the yield and production of cotton as well as other important crops can be increased significantly.

World Cotton Production Outlook:



Source: United States Department of Agriculture (2015-16)

Production and Consumption Statistics:



Source: Pakistan Central Cotton Committee, Ministry of Textile Industry (2015-16)

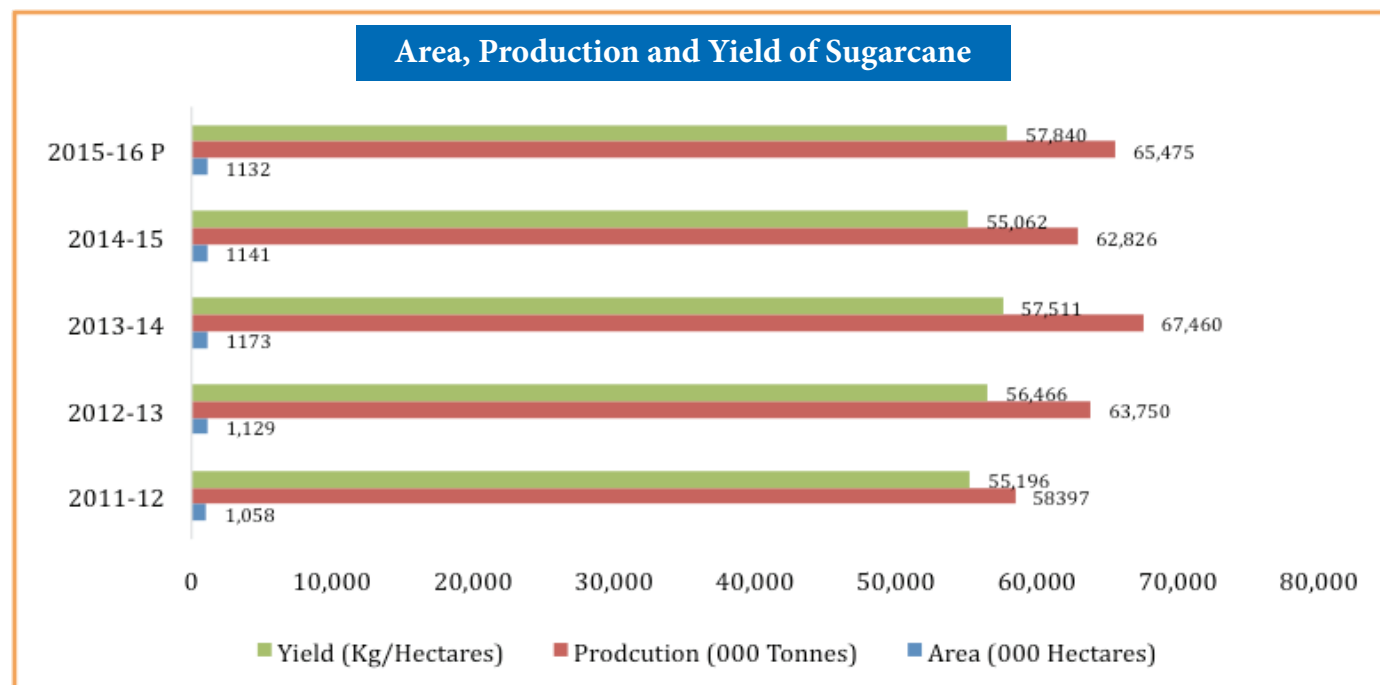
Pakistan is the 8th largest exporter of textile products, and 4th largest producer of cotton in the world. The industrial sector contributes 21.02 percent in GDP from which textile sector contributes 9.5 percent to the national GDP and provides employment to around 15 million people that is around 23% percent of the total labor force (GOP-16).

2.2.4 Sugarcane Crop

Sugarcane is a high value cash crop grown in the Kharif season, and is important in providing raw material for sugar and sugar related industries in the country. Its production accounts for 0.6 percent in overall GDP. The production of sugarcane witnessed a positive growth in this year of 4.22 % over the output of the last year.

Domestic Outlook:

The Provincial governments in their second estimate for FY 2016-17 have indicated the crop area under sugarcane to be 1.225 million hectares compared to 1.131 million hectares of the preceding year. Sugarcane production for 2016-17 is forecasted at 71.371 million tonnes compared to 65.451 million tonnes of the previous year. The increase in area has been reported in Punjab and Sindh over the corresponding period of the last year; increasing by about 12 % in Punjab and almost 2.5 % in Sindh. Similarly, the production in Punjab has increased by 14 % compared to last year and 17% over 2014-15. In Sindh the increase in production over 2014-15 remained at almost 9.0%.



Source: Pakistan Bureau of Statistics (2015-16)
P: Provisional (July- March)

Sugar Statistics in Pakistan:

Sugar Production (2015-16)	"000" Hectares/Tonnes (Est.)
Sugarcane plantation	11,31
Sugarcane produced	65,451
Sugarcane crushed	50,043
Utilization by mills	76.45%
Sugar produced from cane	5,082
Sugar produced from beet	0.033
Total sugar produced	5,115
Carryover stocks (Mills & TCP)	1,344
Sugar availability for 2015-2016	6,459
Export (source: MOIP)	0.294
Domestic consumption	4,900
2015-2016@25.1kg/capita	
Carry forward for 2016-17	1,265

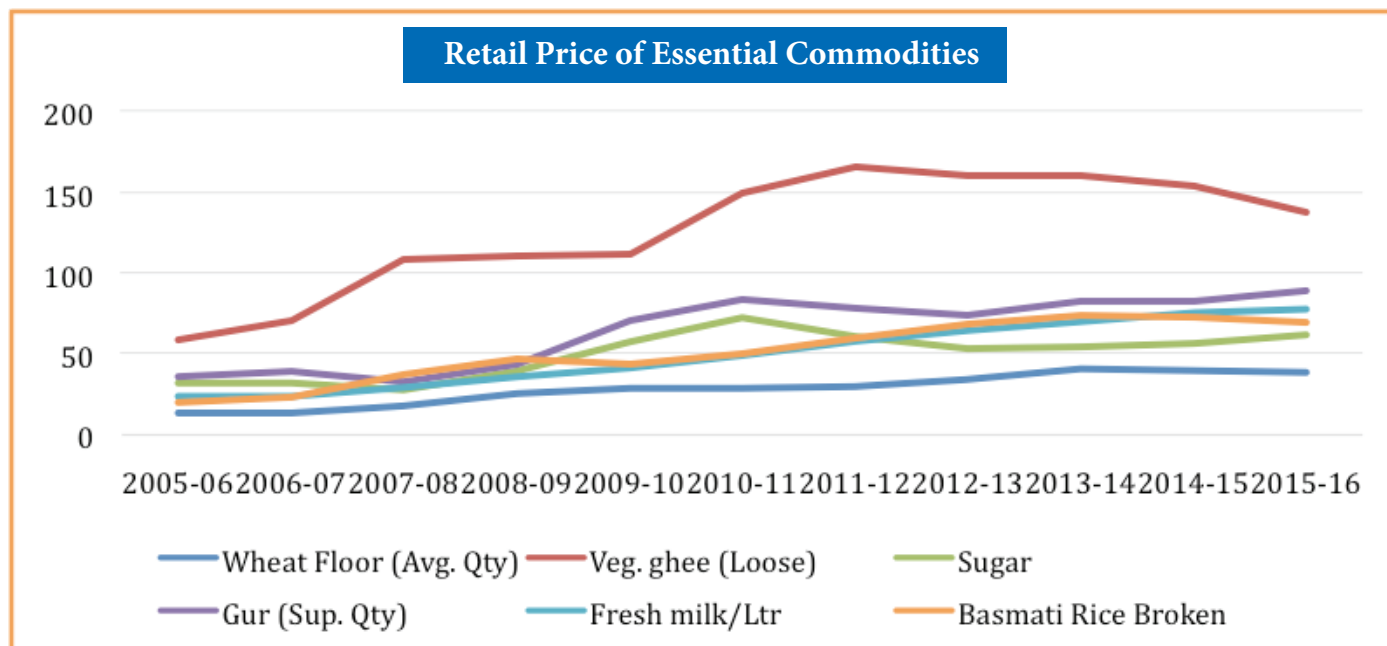
Source: Annual Report PSMA (2015-16)



Beet



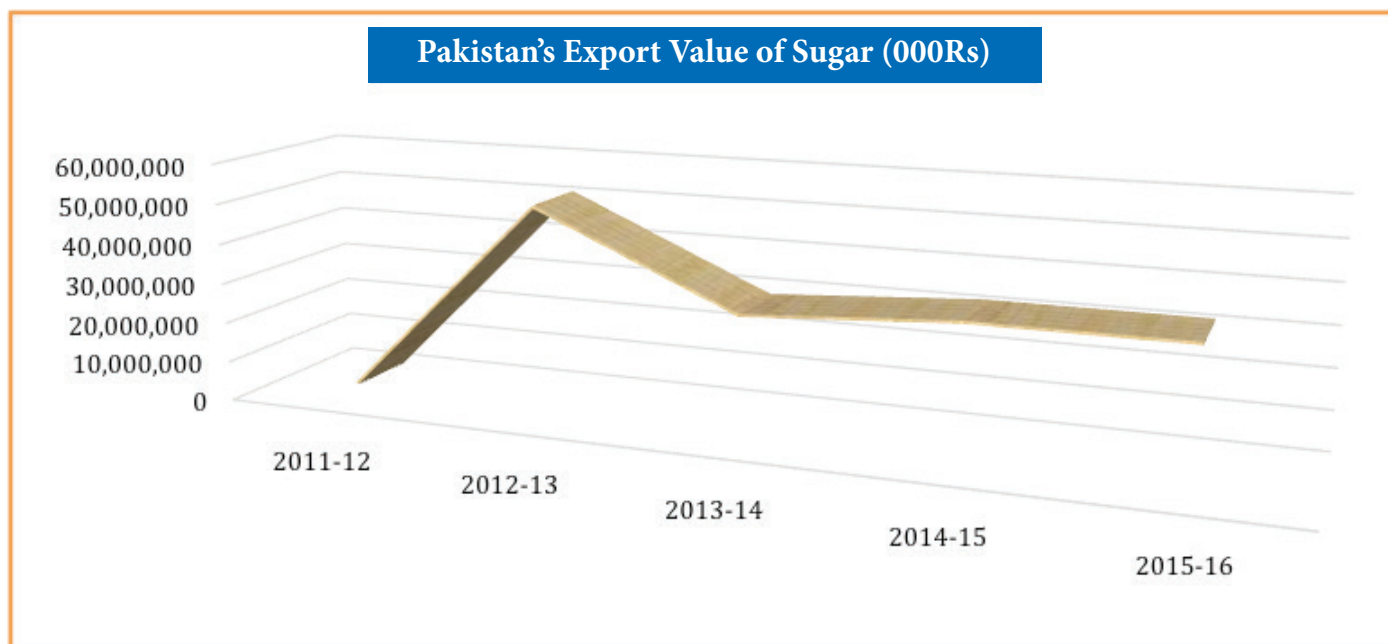
Sugarcane



Source: Annual Report PSMA (2015-16)

Sugar Exports

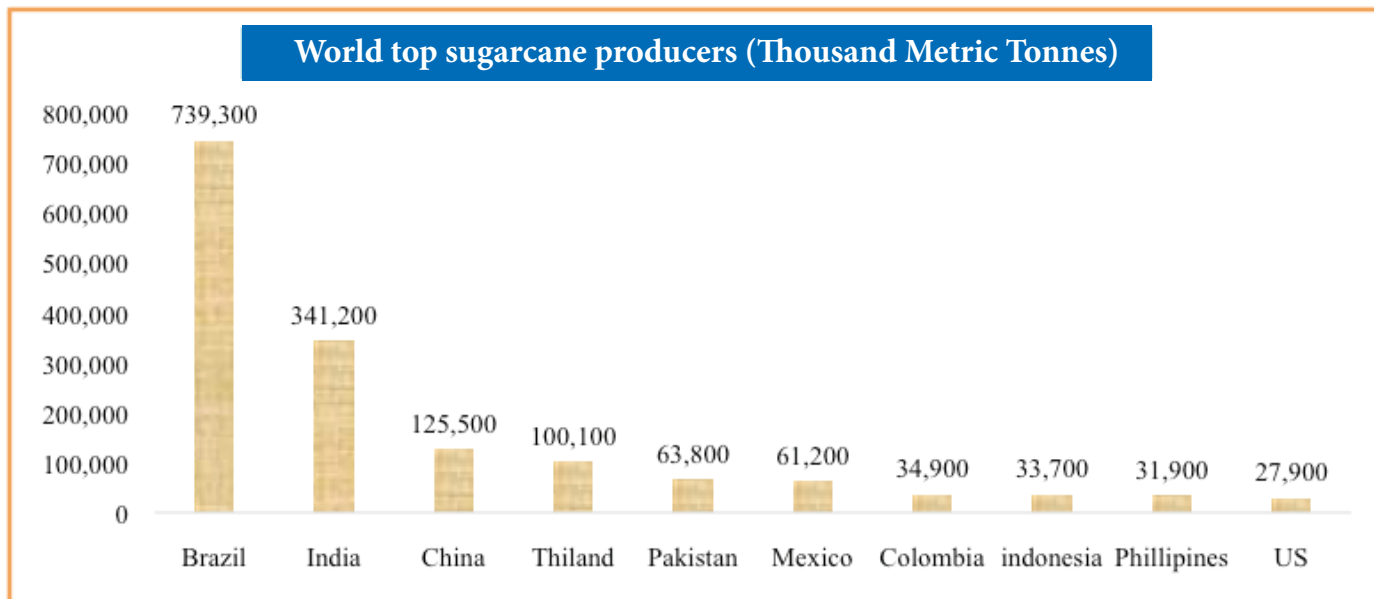
Government of Pakistan allowed in December 2015 a quantity of 500,000 tonnes of sugar for export until March 31, 2016. Since international sugar prices remained low and the export parity was around Rs. 45-47 per kg, export was not feasible due to the high cost of sugar production and low price in domestic and international markets without the Government support in shape of some incentive.



Source: Annual Report PSMA (2015-16)

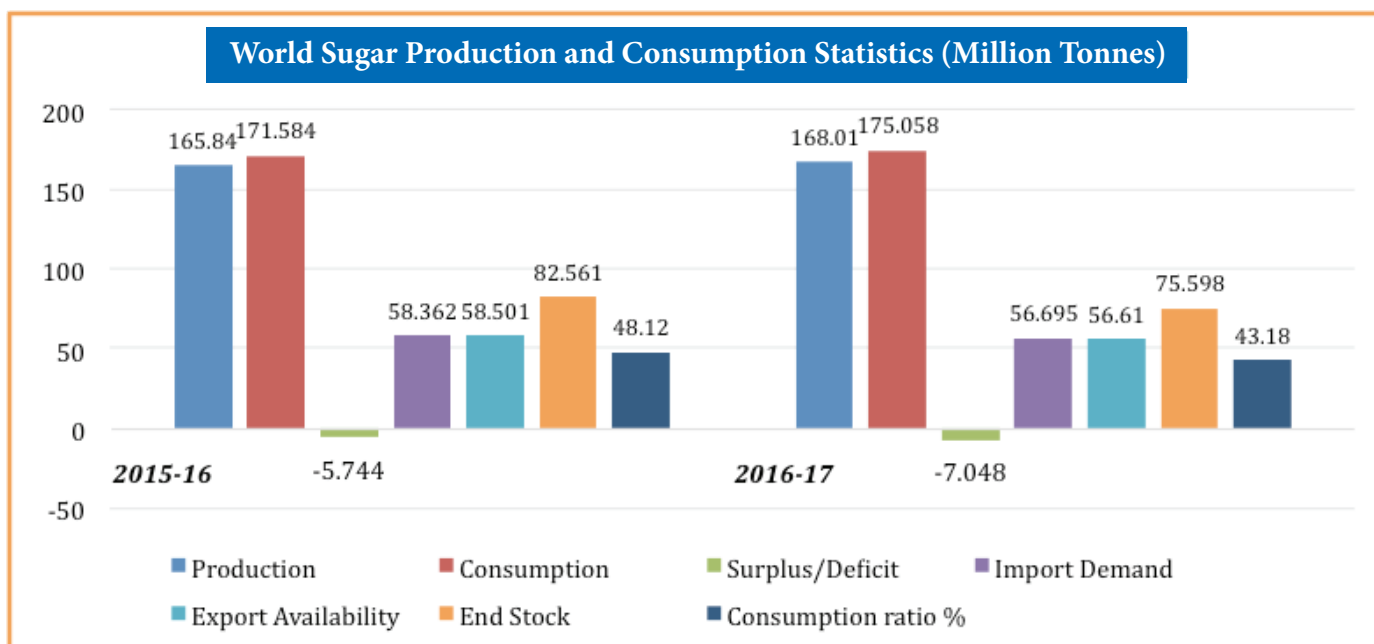
Global Outlook:

The ISO reported, world production for 2016-17 at 168.010 MTS versus 165.840 MTS of the previous year (deficit of 7.048 MTS). Similarly, consumption was estimated at 175.058 MTS versus 171.584 MTS of last year (increase of 2.02% in consumption).



Source: Pakistan Bureau of Statistics (2015-16)

World Sugar Balance:



Source: ISO Quarterly market outlook (August-2016)

Sugar Industries in Pakistan:

S. No	Province	Sugar Mills
1	Punjab	45
2	Sindh	38
3	KPK	7
	Total	90

Source: PSMA (2016)

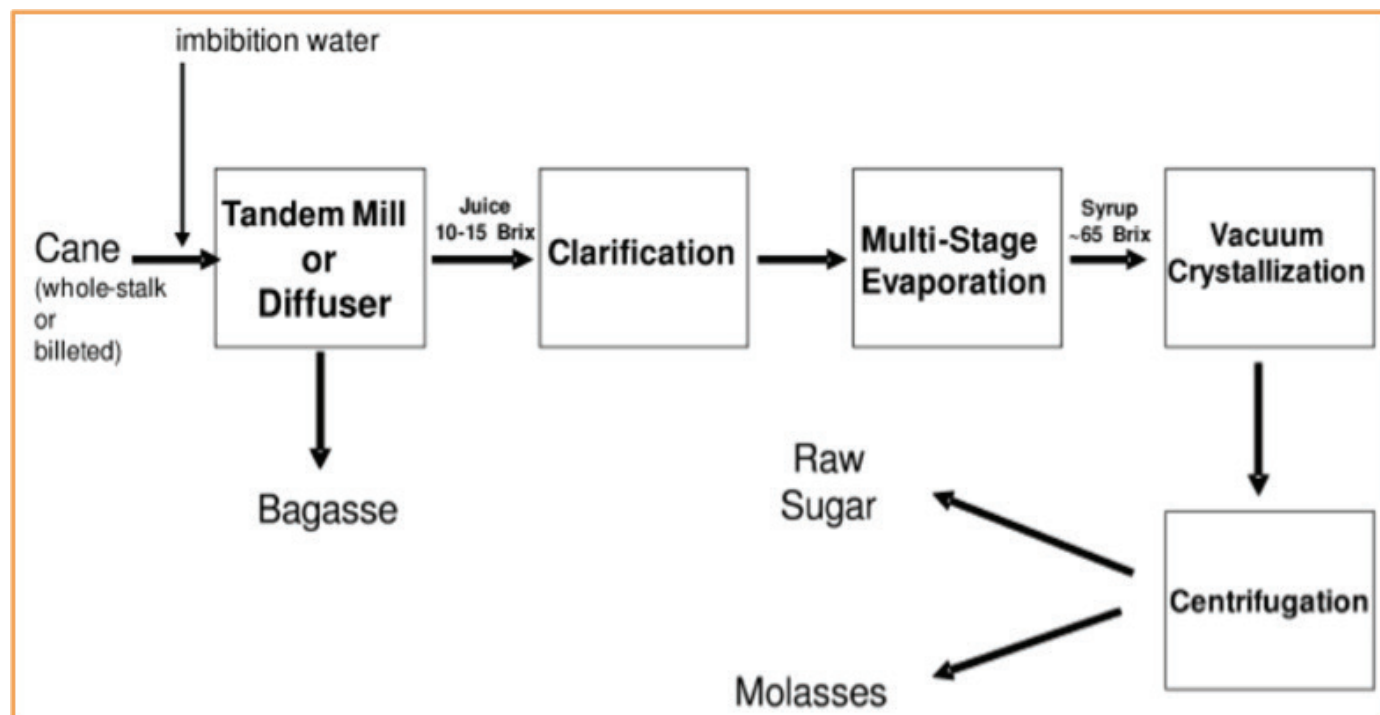
Power Generation:

Sugar mills in Pakistan have been producing surplus bagasse, a renewable energy fuel as a by-product in the sugar manufacturing process. Currently they generate 145.10 MW electricity from bagasse, but they have potential to increase production to 2000-3000 MW (PSMA-2016).

By products of Sugarcane:

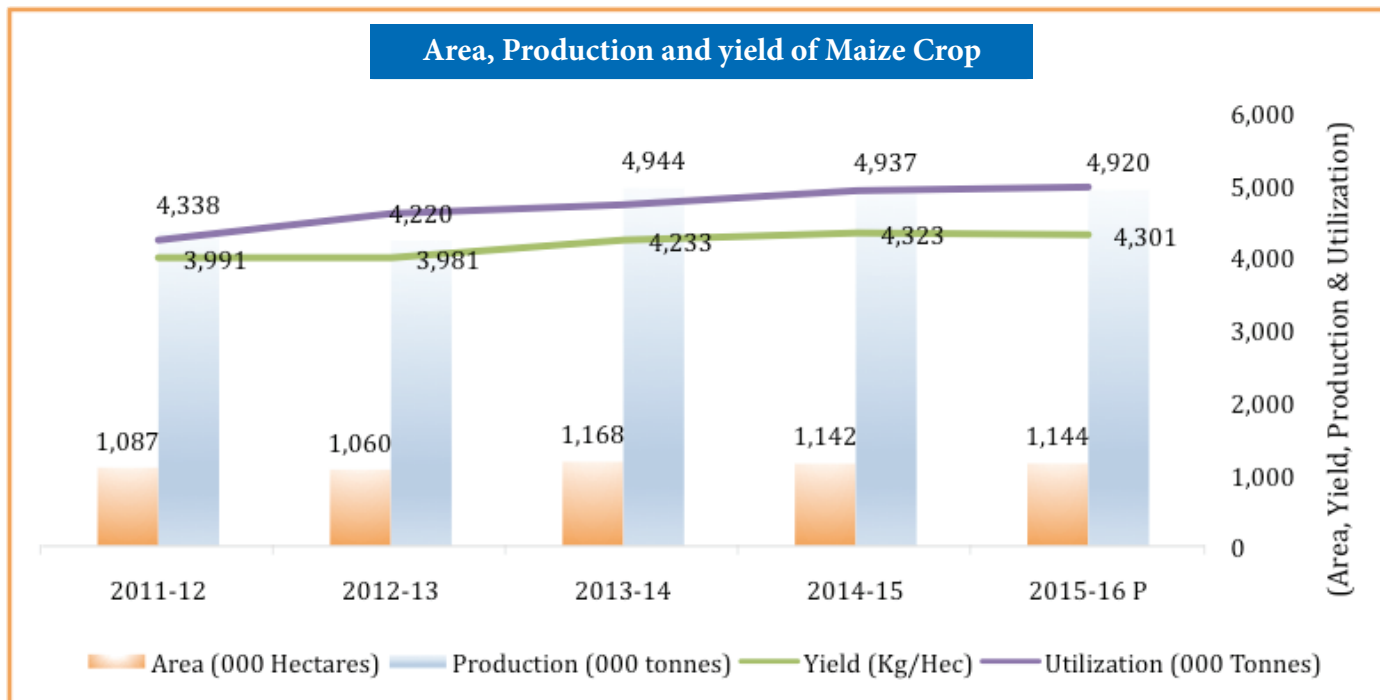
Bagasse, Molasses, Special sugars, Bioplastics, Biowater, Biofertilizers.

Cane to Sugar Process:



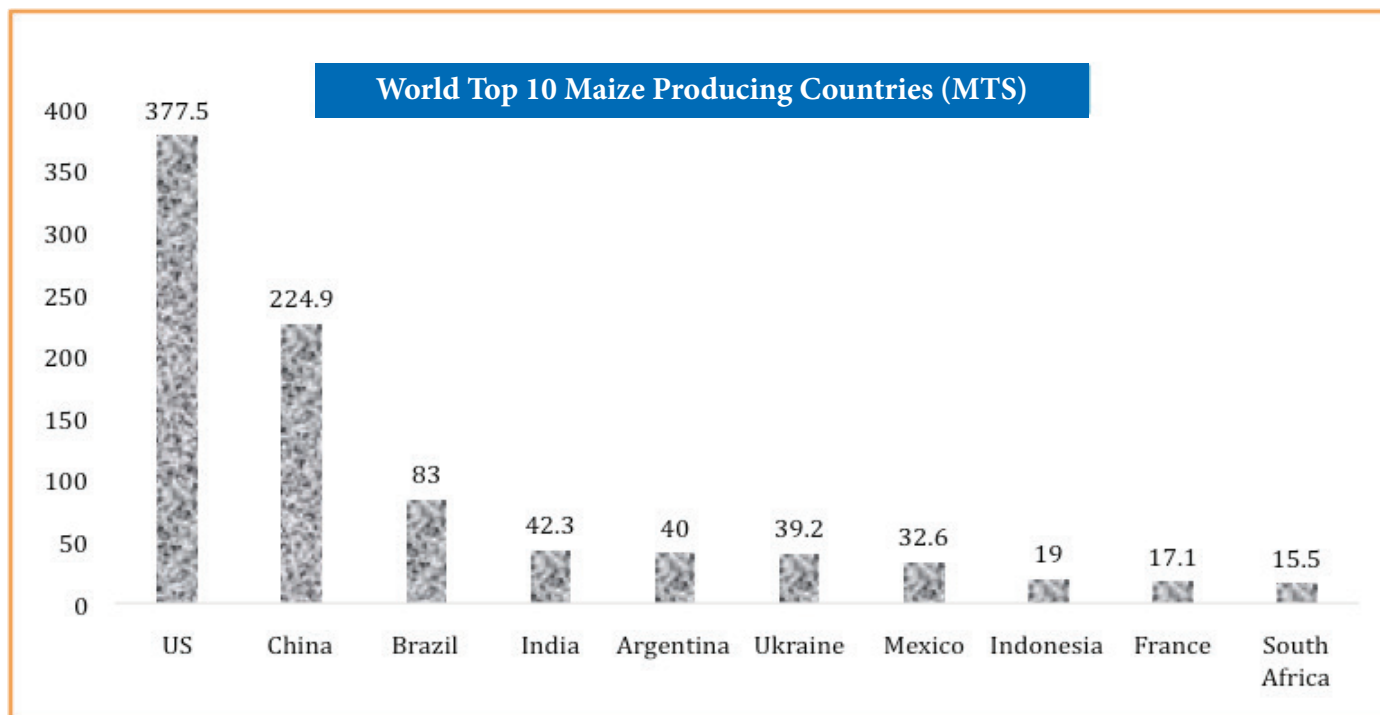
2.2.5 Maize Crop

Maize contributes 2.2 percent to the value added in agriculture and 0.4 percent to GDP. Maize production decreased to 4,920 thousand tonnes in 2016, as compared to 4,937 thousand tonnes in 2015; recording a decrease of 0.3 percent.

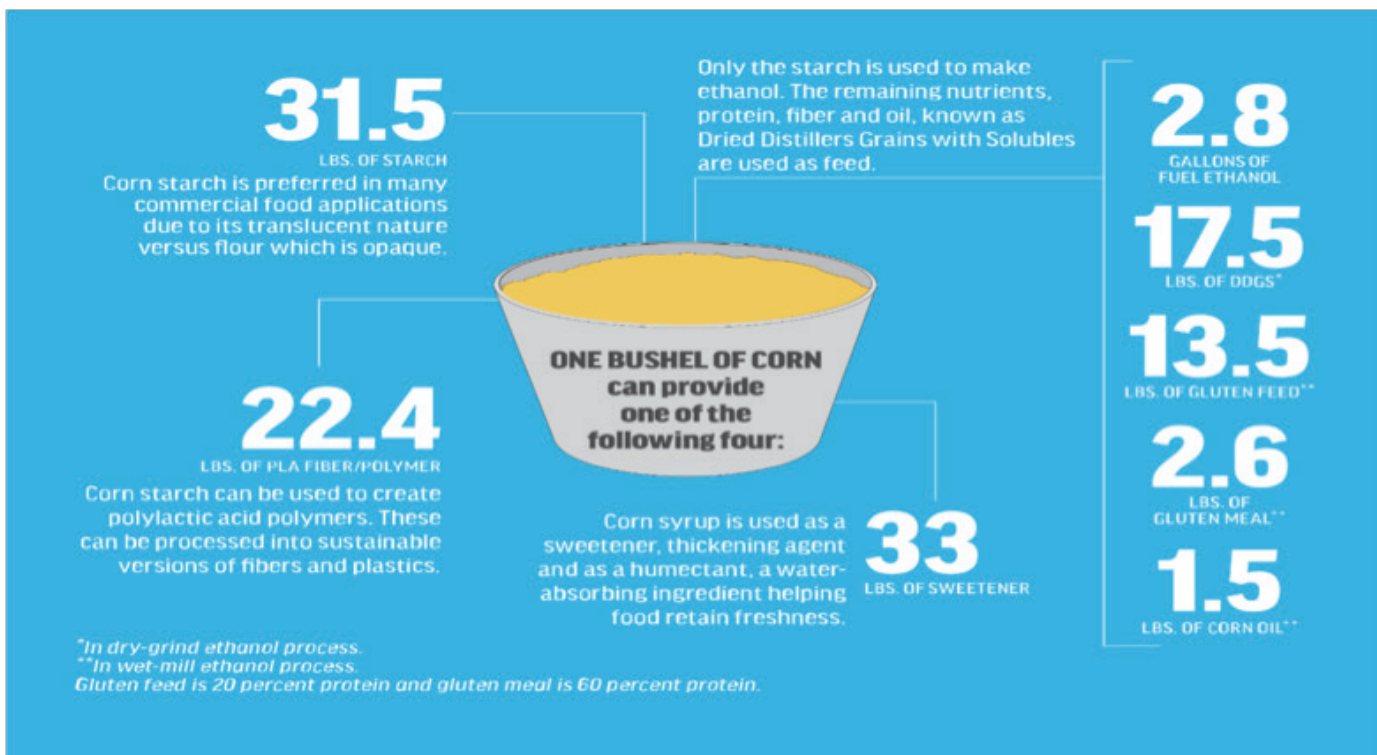
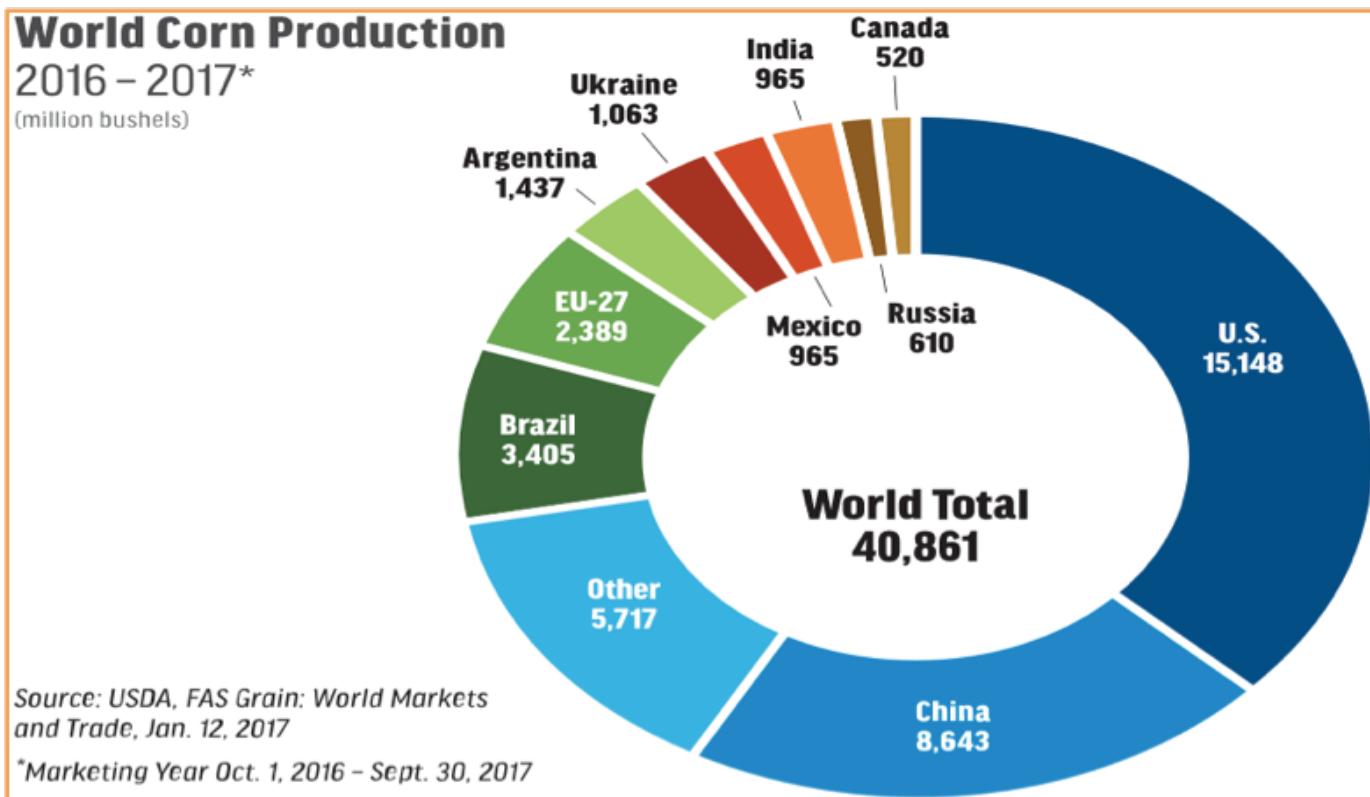


P: Provisional (July- March)

Source: Pakistan Bureau of Statistics (2015-16)



Source: FAOSTAT (2015-16)



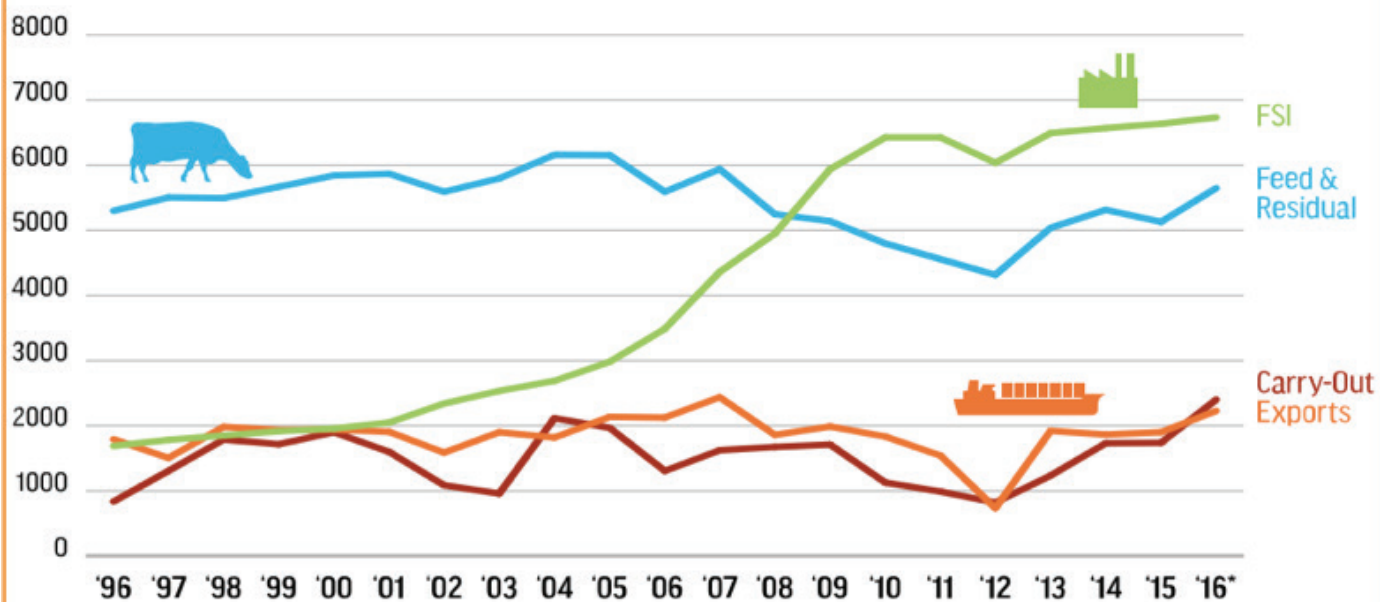
Source: USDA-United States Department of Agriculture (2016)

Note: 1 bushel corn = 25.40 KG, 1 bushel wheat = 27.22 KG

Corn Processed by Segment

1996 - 2016

(million bushels)

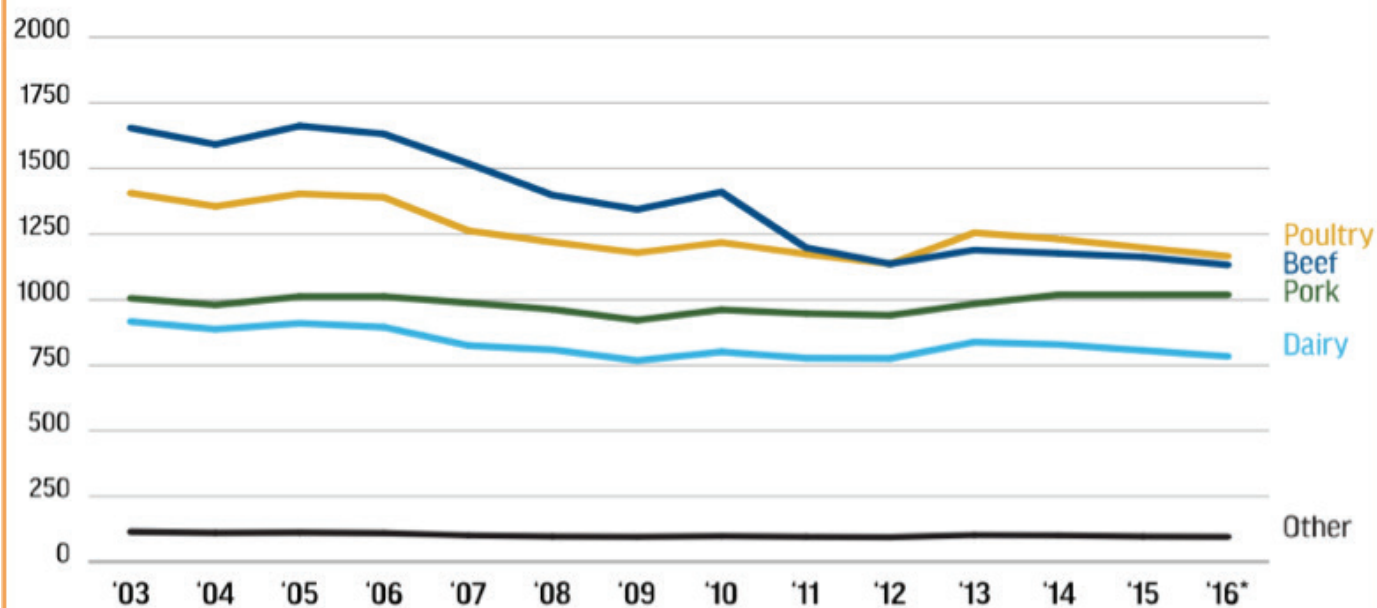


Source: USDA, ERS Feed Outlook

*projection

Corn Fed by Species 2003 - 2016

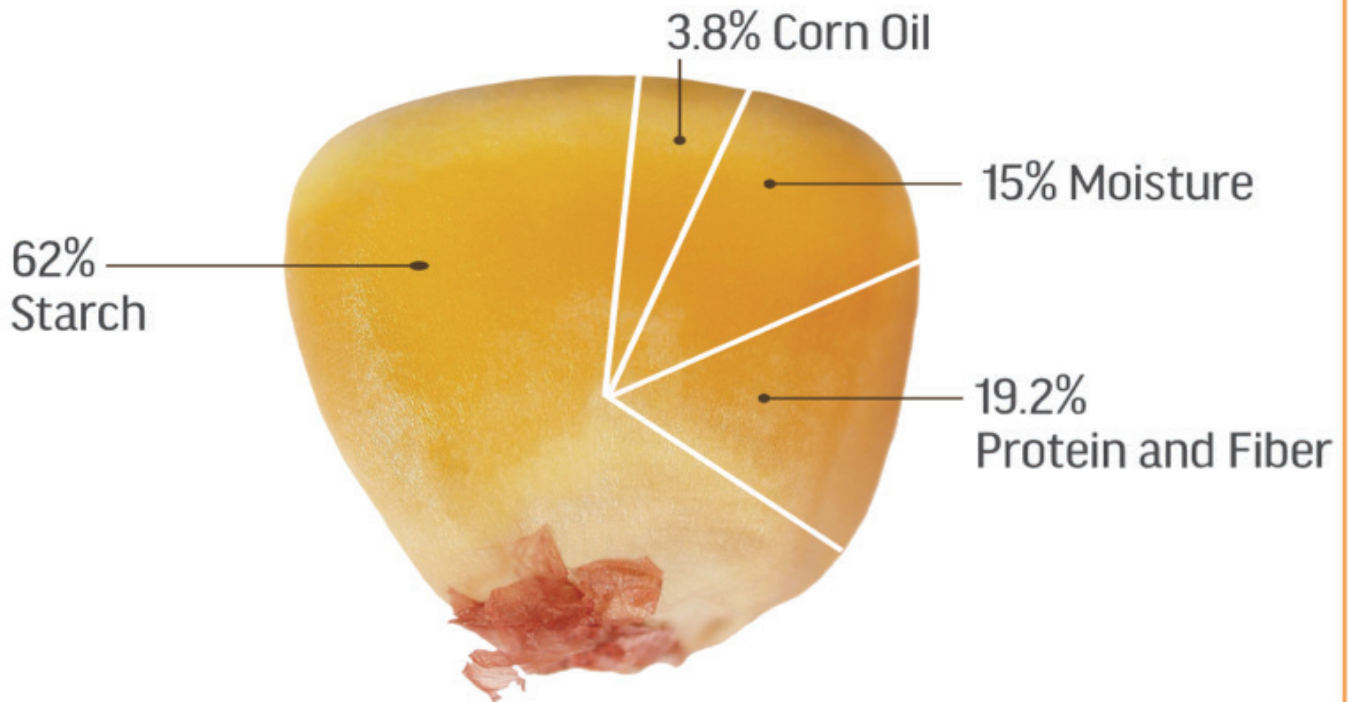
(million bushels)



Source: ProExporter Network, Crop Year Ending Aug. 31, 2017

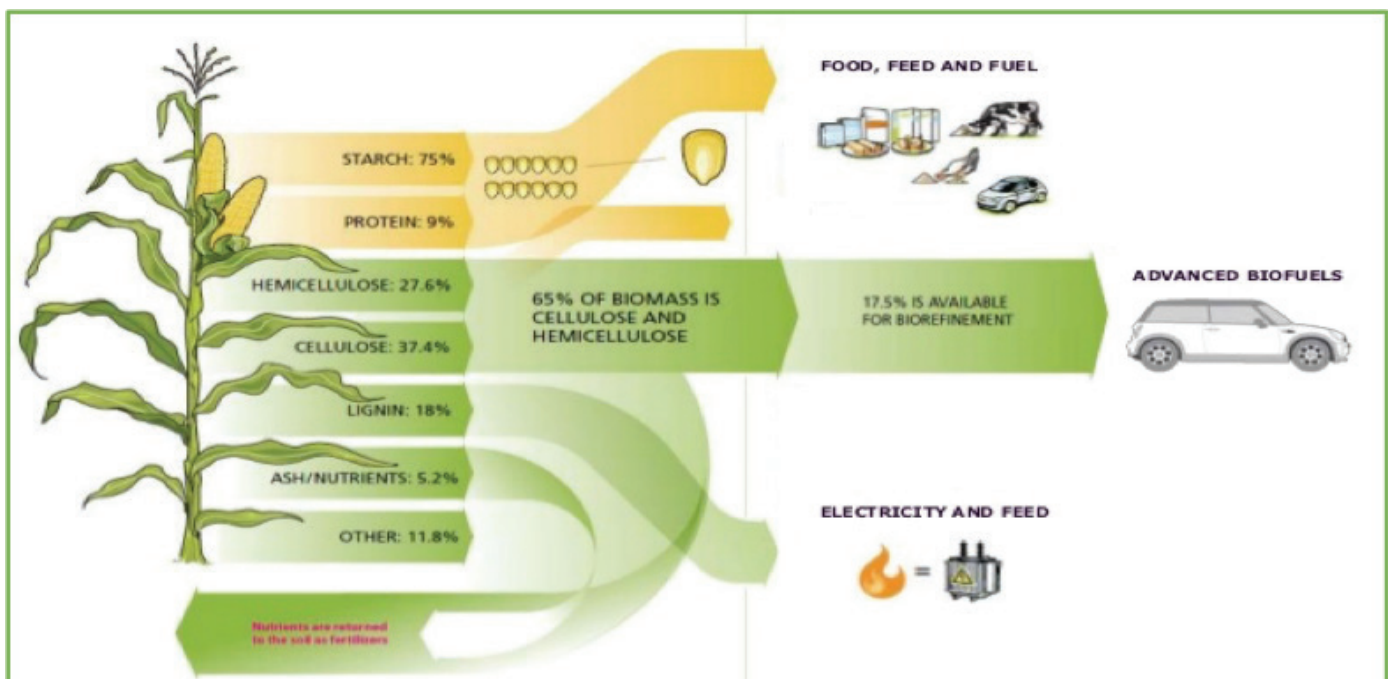
*projections

COMPONENTS OF YELLOW DENT CORN



Source: Corn Chemistry and Technology, 1999

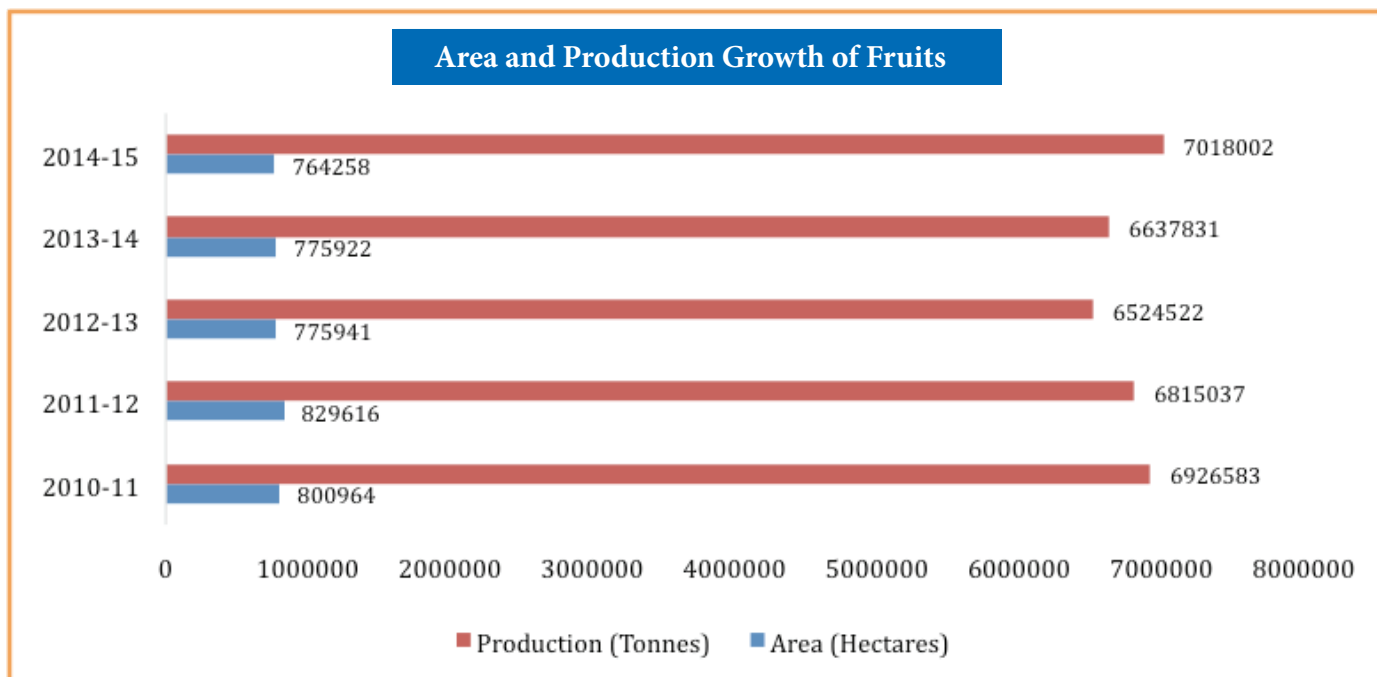
Maize is a Power Plant - Power for Food, Feed and Fuel:



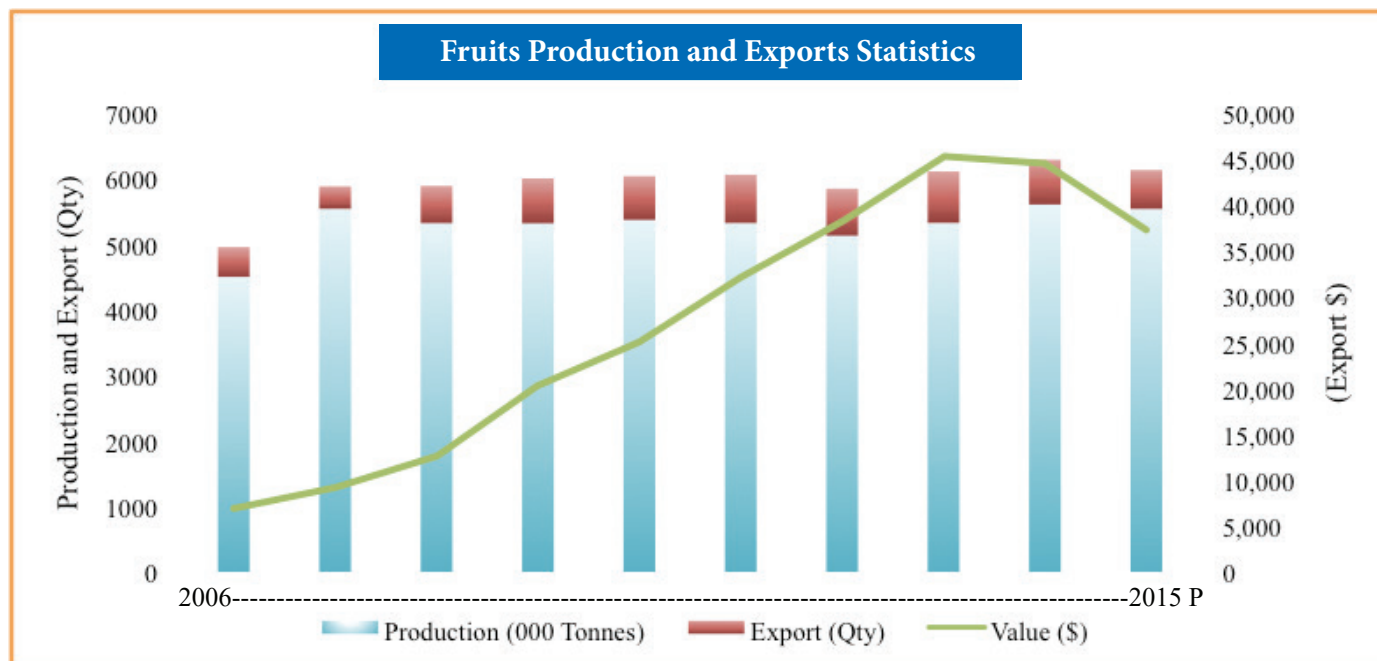
2.3 OTHER IMPORTANT CROPS

2.3.1 Fruits

Exports earnings from fruits also registered a decline of 5.3 percent in value and 10.9 percent in quantity in the last financial year.



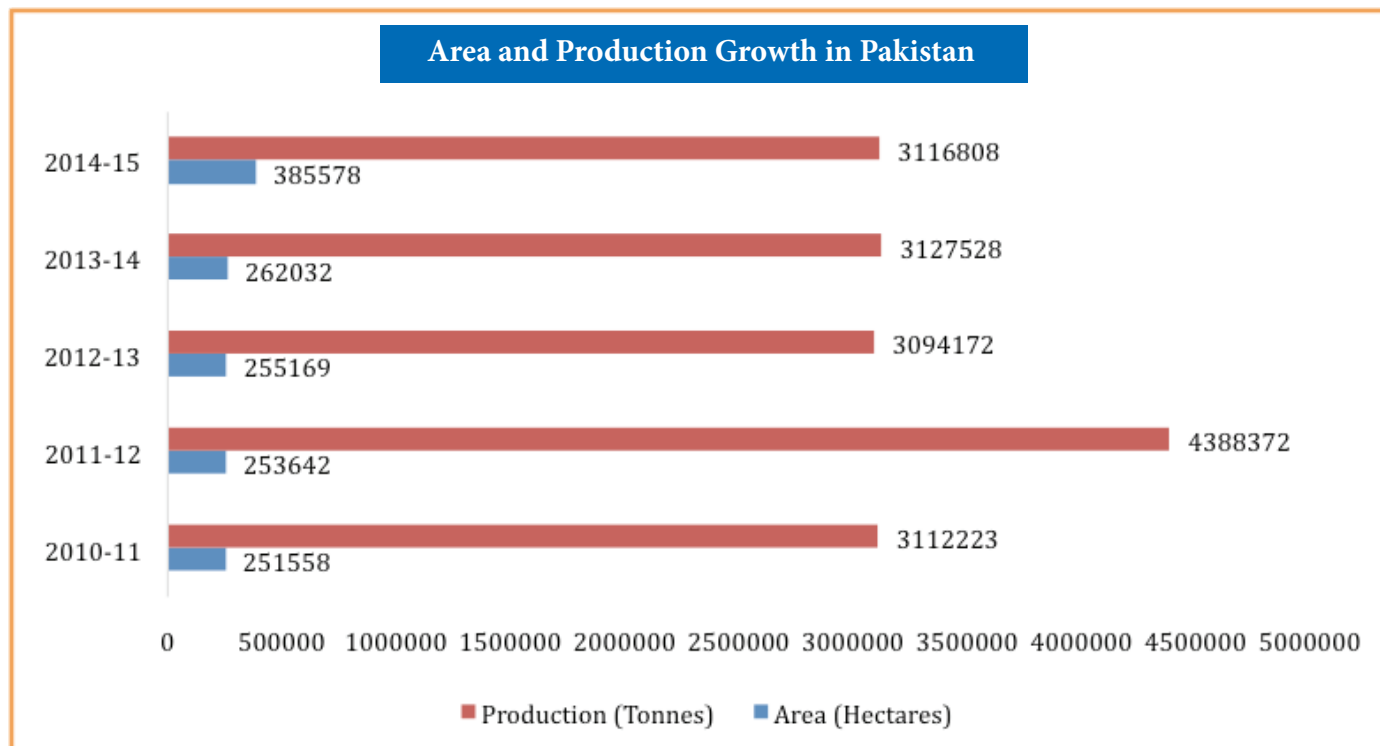
Source: Ministry of National Food Security & Research Islamabad (2015)



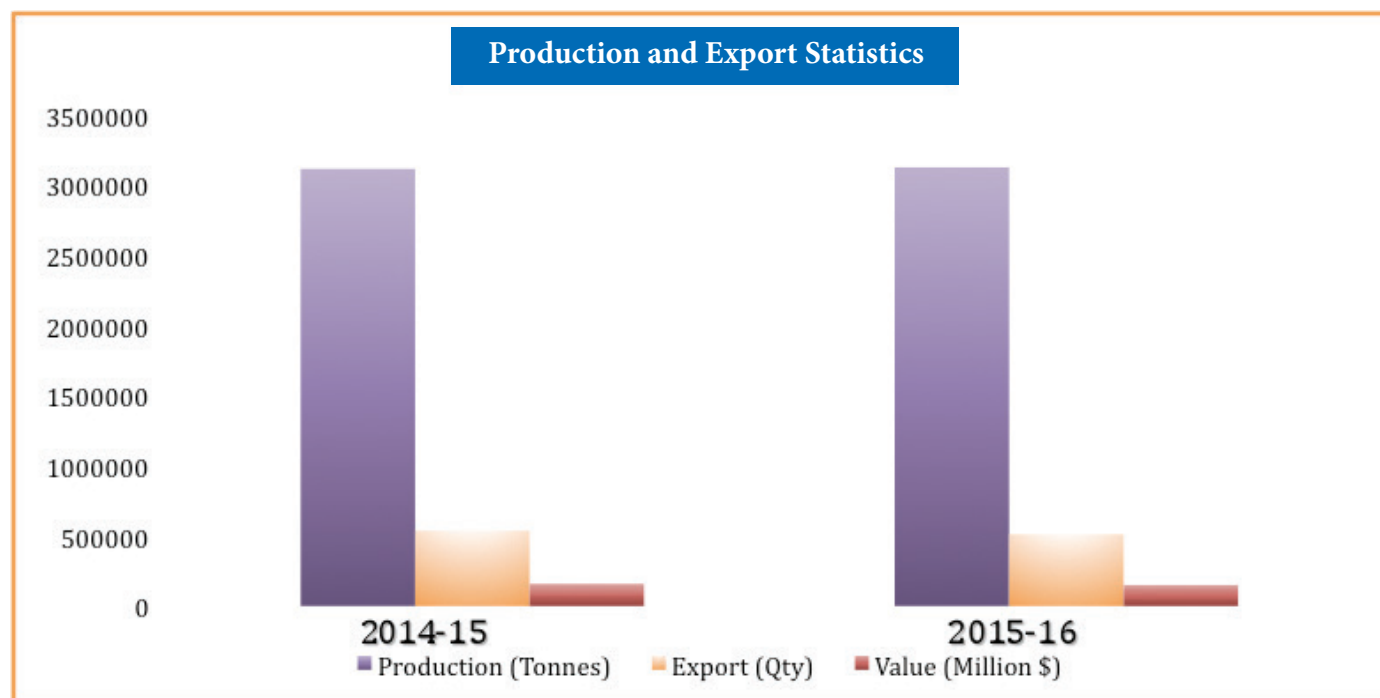
Source: Pakistan Bureau of Statistics (2015-16)
P: Provisional (July- March)

2.3.2 Vegetables

Exports earnings from vegetables also registered a decline of 5.4 percent in value and 4.8 percent in quantity, in the last financial year.

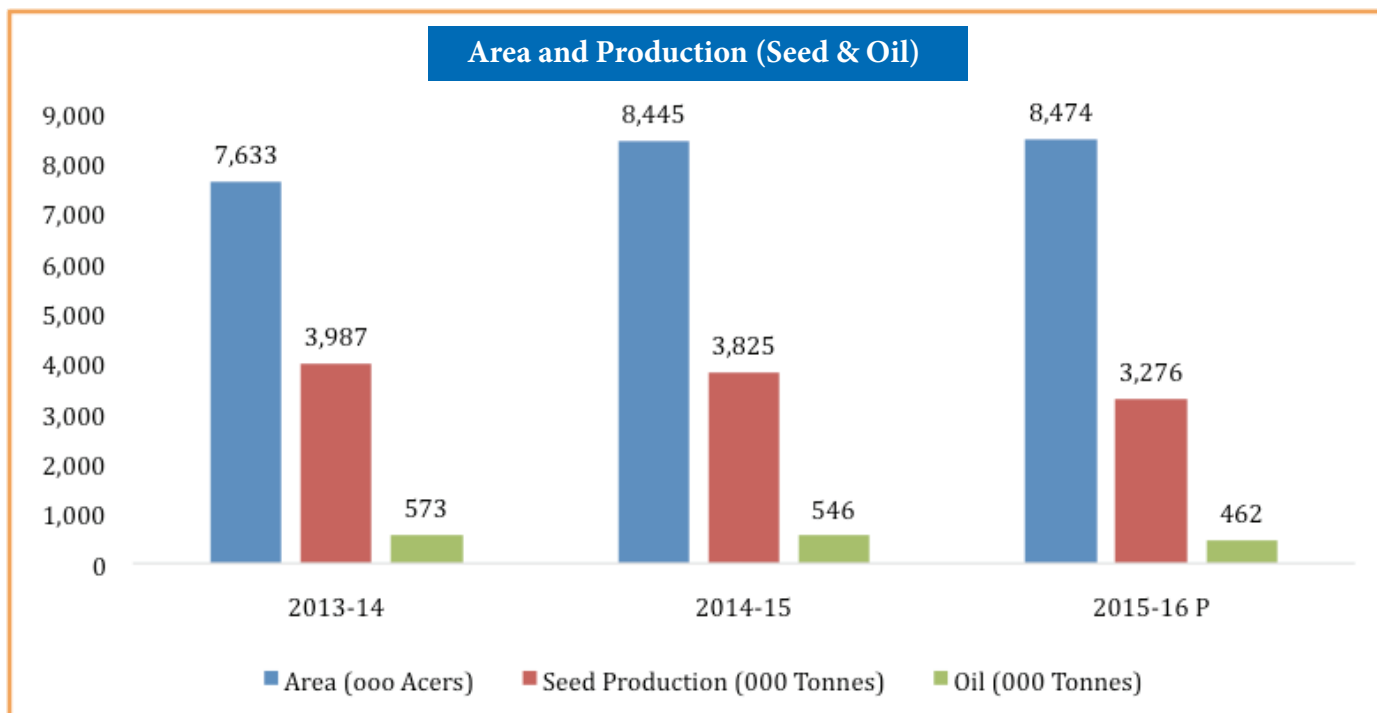


Source: Ministry of National Food Security & Research Islamabad (2015)



Source: Pakistan Bureau of Statistics (2015-16)

2.3.3 Oilseeds



P: Provisional (July- March)

Source: Pakistan Oilseed Development Board (2016)





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Chapter: 3

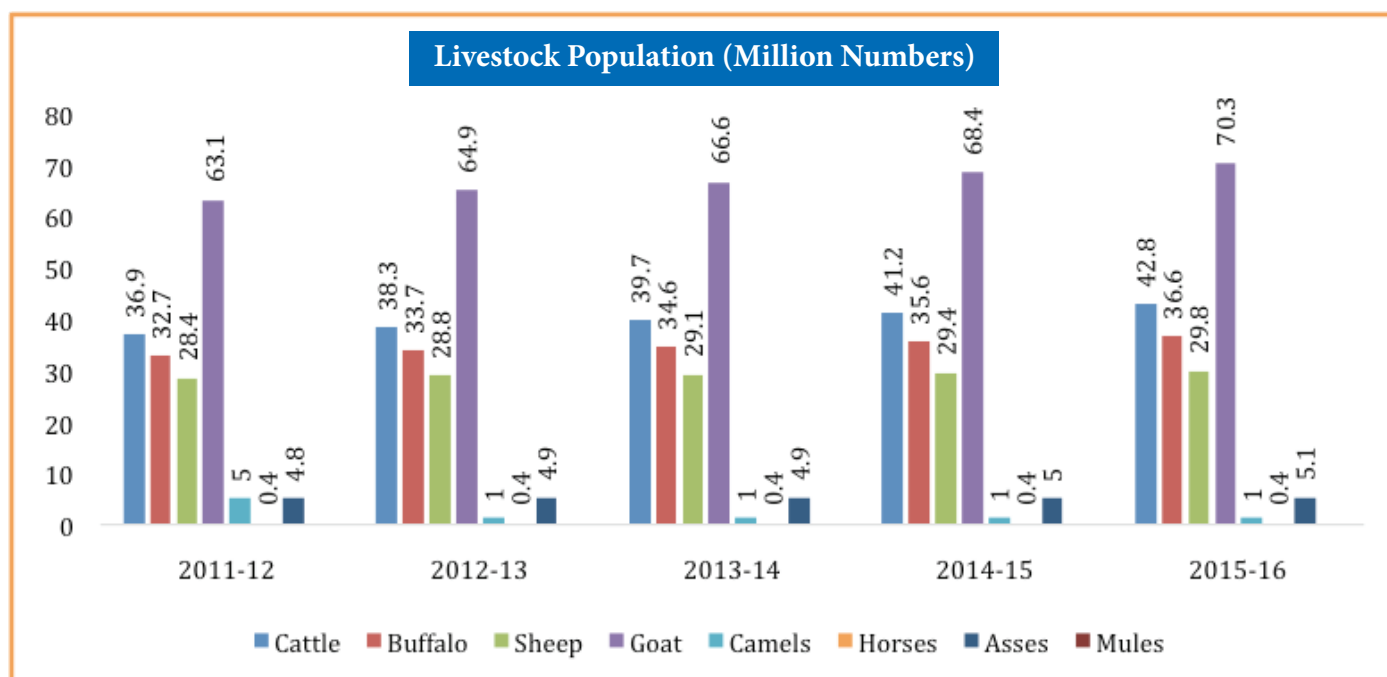
LIVESTOCK IN PAKISTAN

LIVESTOCK IN PAKISTAN

3.1 Current Status:

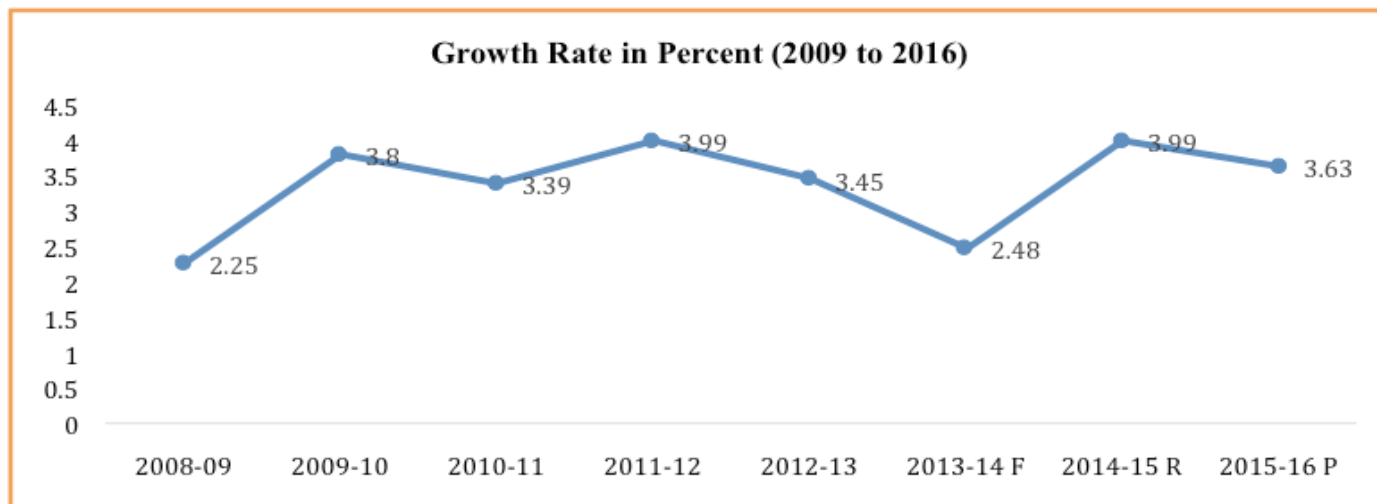
Livestock is an important segment of the agriculture sector. Its contribution is vital towards rural socio-economic development. Approximately 8 million families are involved in livestock raising, deriving more than 35 percent income from livestock farming. It is central to the livelihood of the rural poor in the country. Through suitable policies, this sector can be developed further and can play a significant role in the alleviation of poverty from underdeveloped communities.

Livestock contributed approximately 58.6 percent to the agriculture value added and 11.6 percent to the overall GDP during 2015-16 compared to 56.4 percent and 11.7 percent during the corresponding period last year, respectively. Gross value addition of livestock at constant cost factor of 2005-06 has increased from Rs. 1247 billion (2014-15) to Rs. 1292 billion (2015-16), showing an increase of 3.63 percent over the same period last year. The livestock population for the last three years is given in the figure below.



Source: Government of Pakistan, (2016)

Livestock Population Growth:

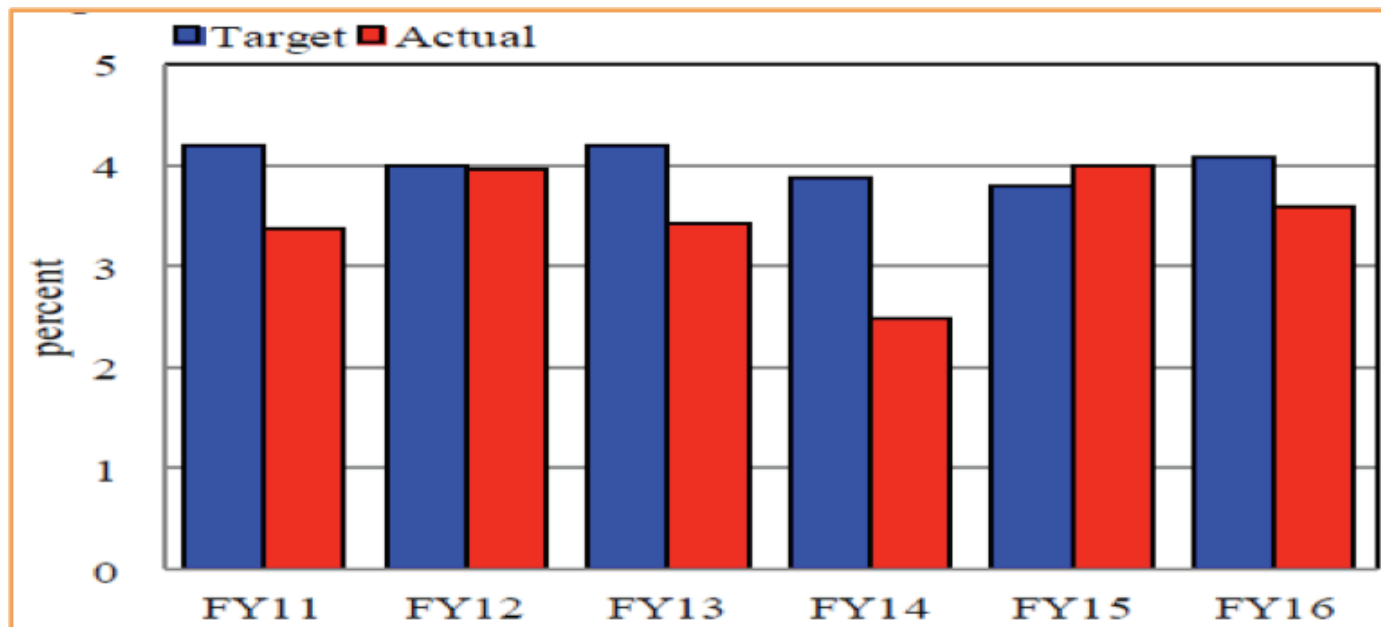


Source: Government of Pakistan, (2016)

Livestock Breeds:

Pakistan has few recognized cattle breeds particularly, Neeli Ravi, Kundi buffaloes besides Sahiwal, Red Sindhi and a few others. There are few dedicated breeding facilities available from the public sector. AI (Artificial insemination) techniques are commonplace in cattle farms but outreach is limited creating wide gaps in service provision that is filled by the private sector. The Punjab Livestock and Dairy Development Board (PLDDB) is at the forefront in Punjab which is the leading province in this sector; with Sindh, KPK, and Baluchistan lagging behind significantly.

Growth in Livestock value addition:



Source: SBP-Annual Report, Pakistan Bureau of Statistics, (2016)

3.2 Livestock Products:

3.2.1 Milk and Dairy Products:

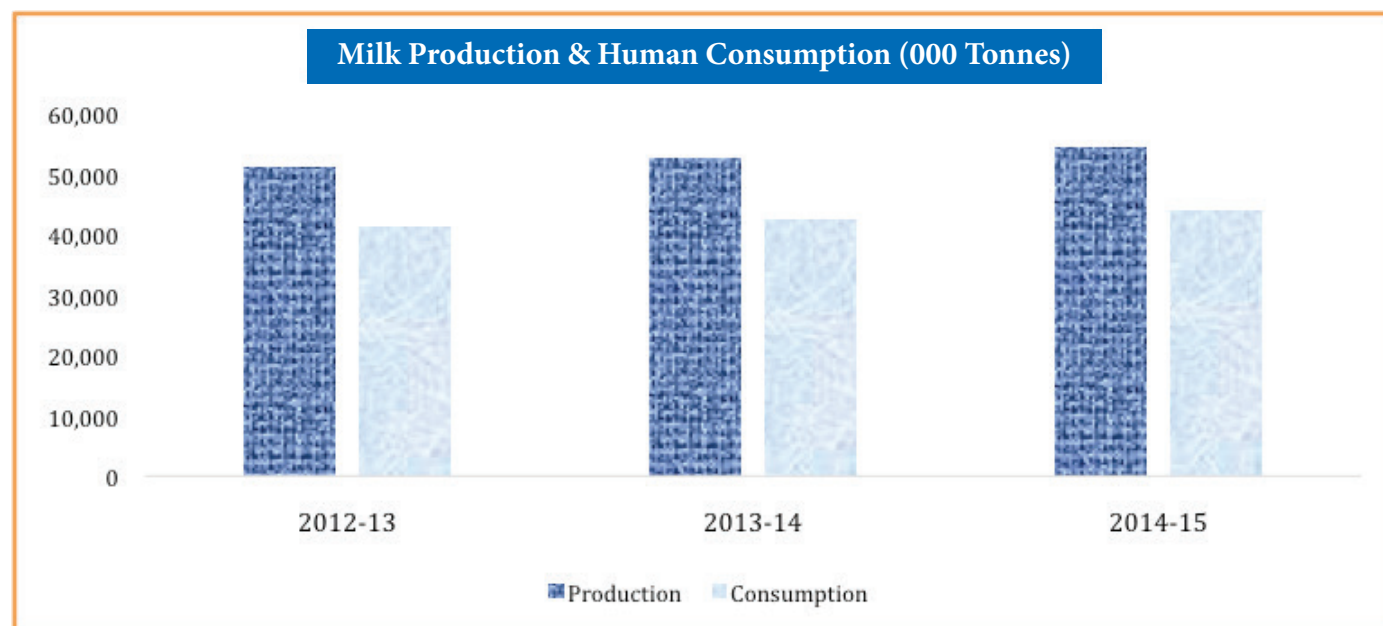
Pakistan is the world's fourth largest milk producer having different types of milk and milk products including liquid milk, flavored Milk, yogurt, powdered milk, lassi (sour milk), desi ghee, butter, ice cream cheese, sweets, bakery items, and khoya (sweetened condensed milk pastry).

Milk's Production (000 Tonnes) in Pakistan:

Species	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Cow	15,546	16,133	16,741	17,372	18,027	18,706	19,412
Buffalo	27,848	28,694	29,565	30,350	31,252	32,180	33,137
Sheep	36	26	37	37	38	38	39
Goat	739	759	779	801	822	845	867
Camel	808	818	829	840	851	862	873

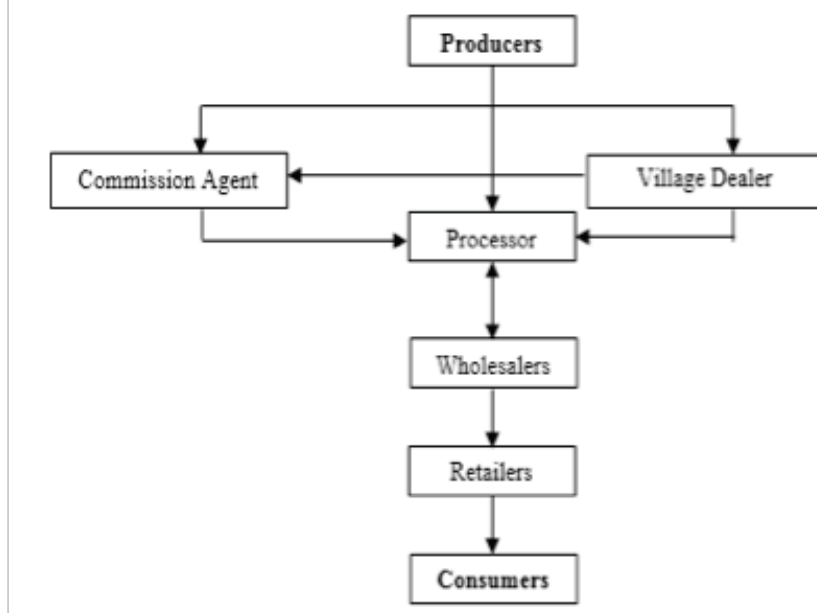
Source: Ministry of Food Security and Research (GOP-2016)

Pakistan's Gross Production and Consumption of Milk:



Source: Economic Survey of Pakistan (2016)

Milk Marketing Channels in Pakistan:



Source: Qamar Mohy-ud-Din and Hammad Badar (2011). *Marketing of Agricultural Products in Pakistan: Theory & Practice*. Higher Education Commission (HEC), Pakistan.

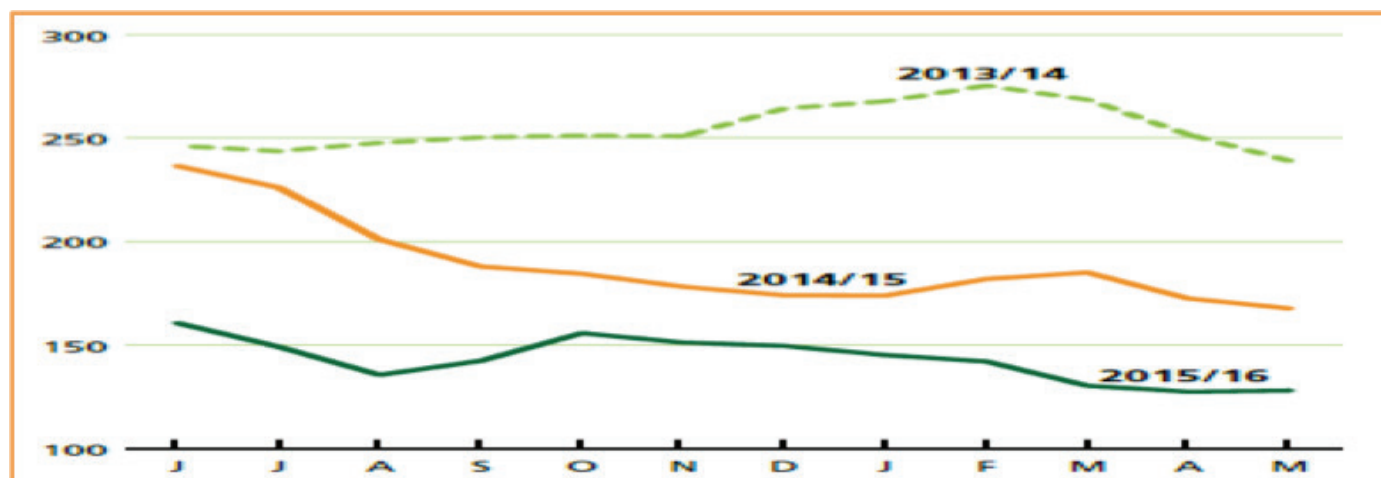
Trade Glance:

World Dairy Market at a Glance (Million Tonnes):

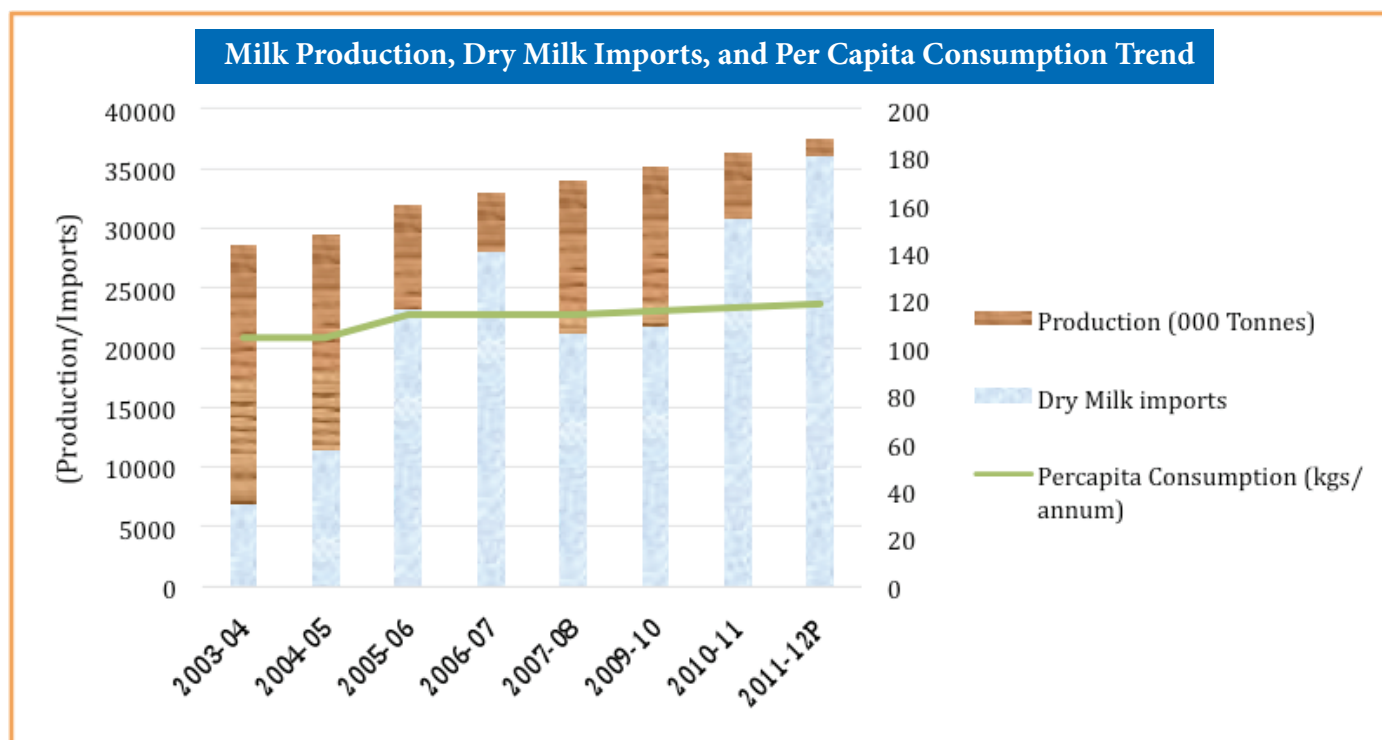
	2014	2015	2016 F
Total Milk Production	789.1	802.2	816.0
Total Trade	72.1	72.1	73.2
World Per Capita Consumption (Kg/Year)	108.6	109.2	109.8
Trade Share of Production (%)	9.1	9.0	9.0

Source: FAO-United Nations (2015-16)

FAO-International Dairy Price Index (2002-2004=100):

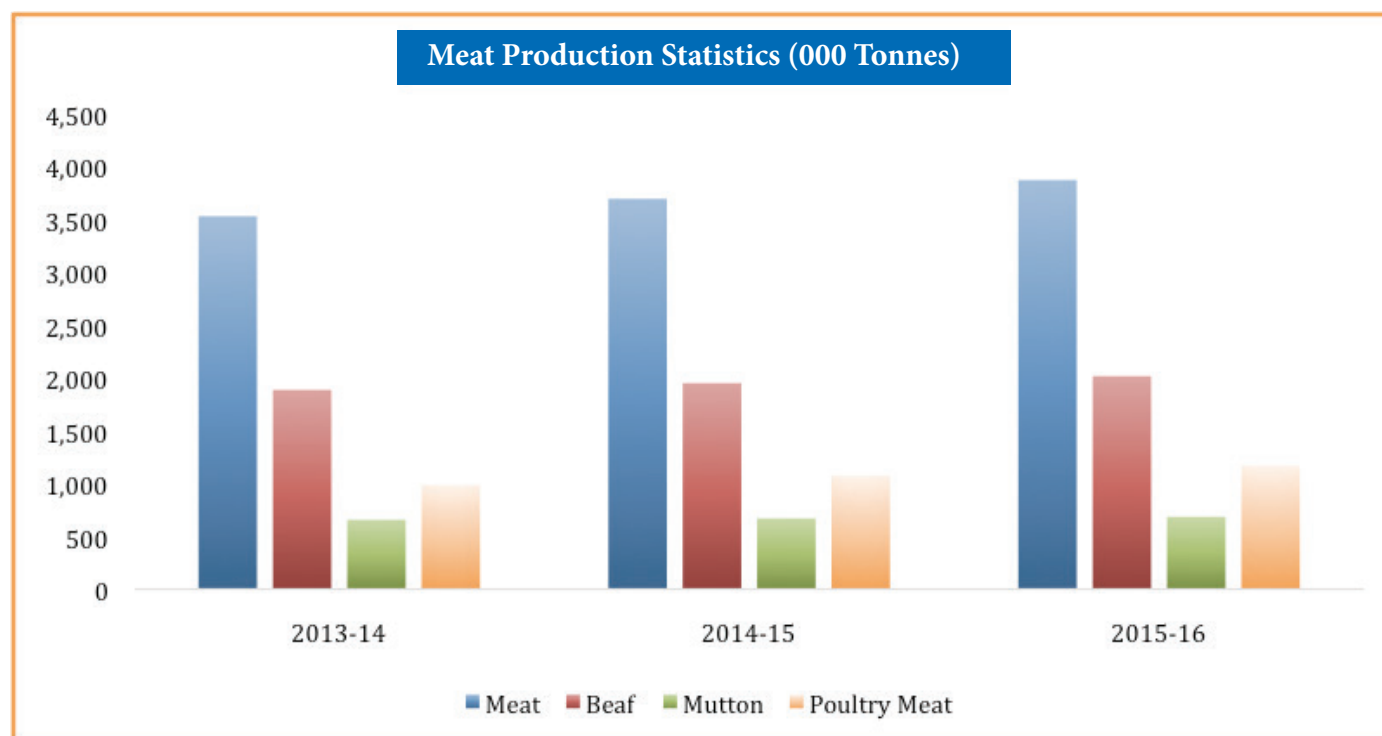


Source: FAO-United Nations (2015-16)

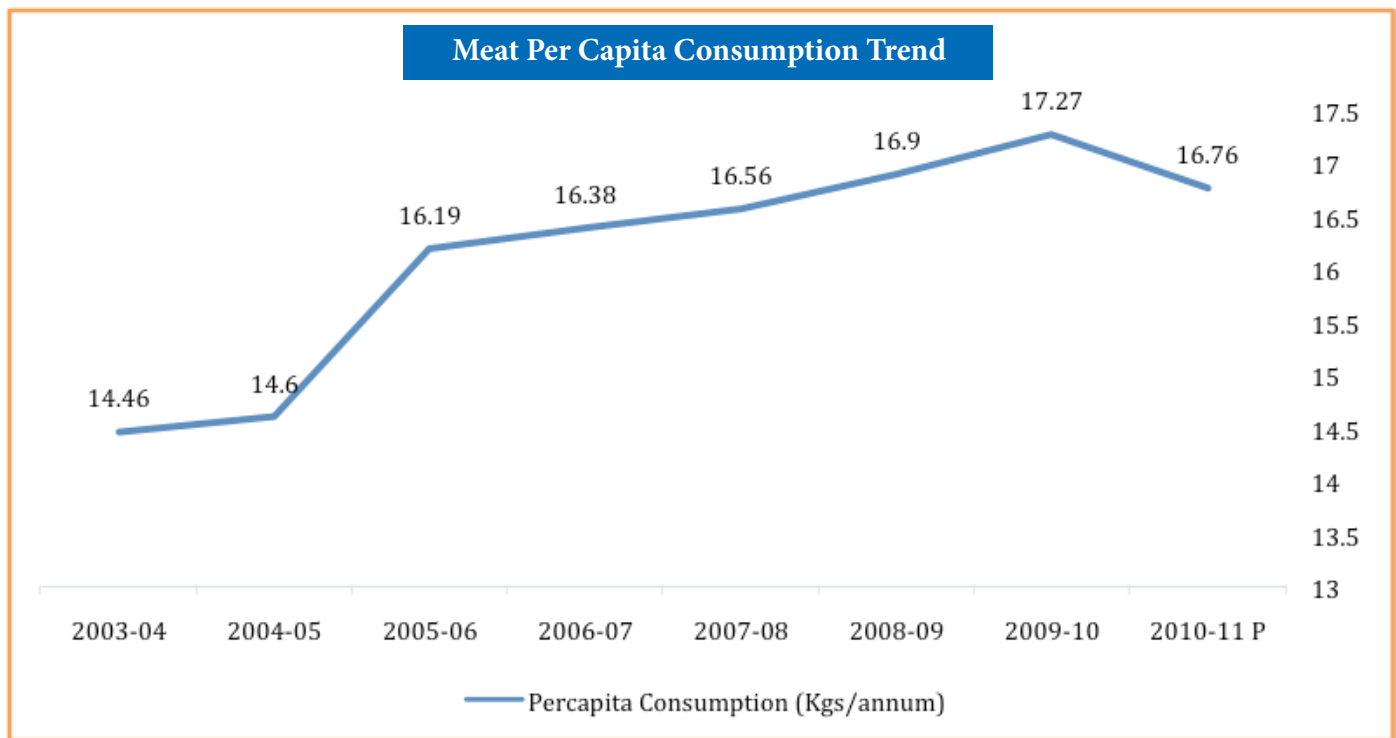


Source: Planning & Development Division (Nutrition Section) Islamabad

3.2.2 Meat & Meat Products:

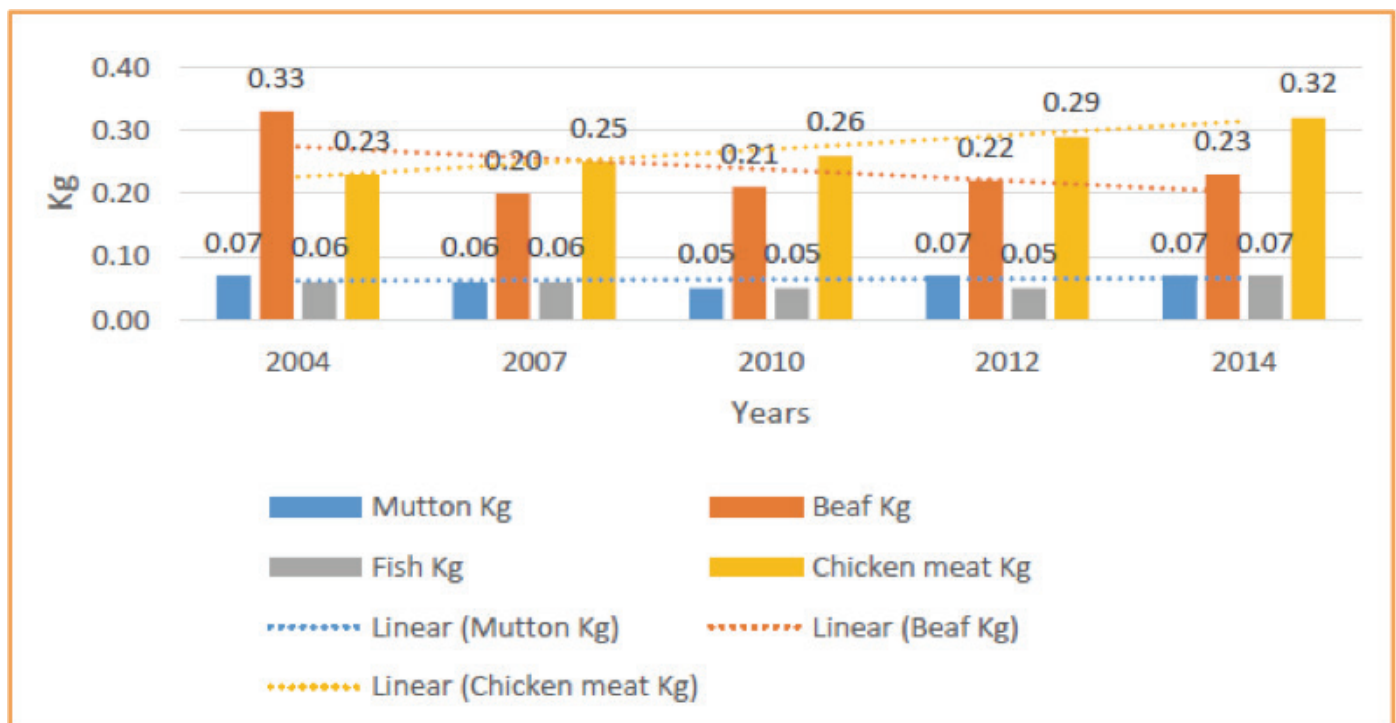


Source: Economic Survey of Pakistan (2015-16)



Source: Pakistan Bureau of Statistics

Meat Products Per capita Consumption Statistics:

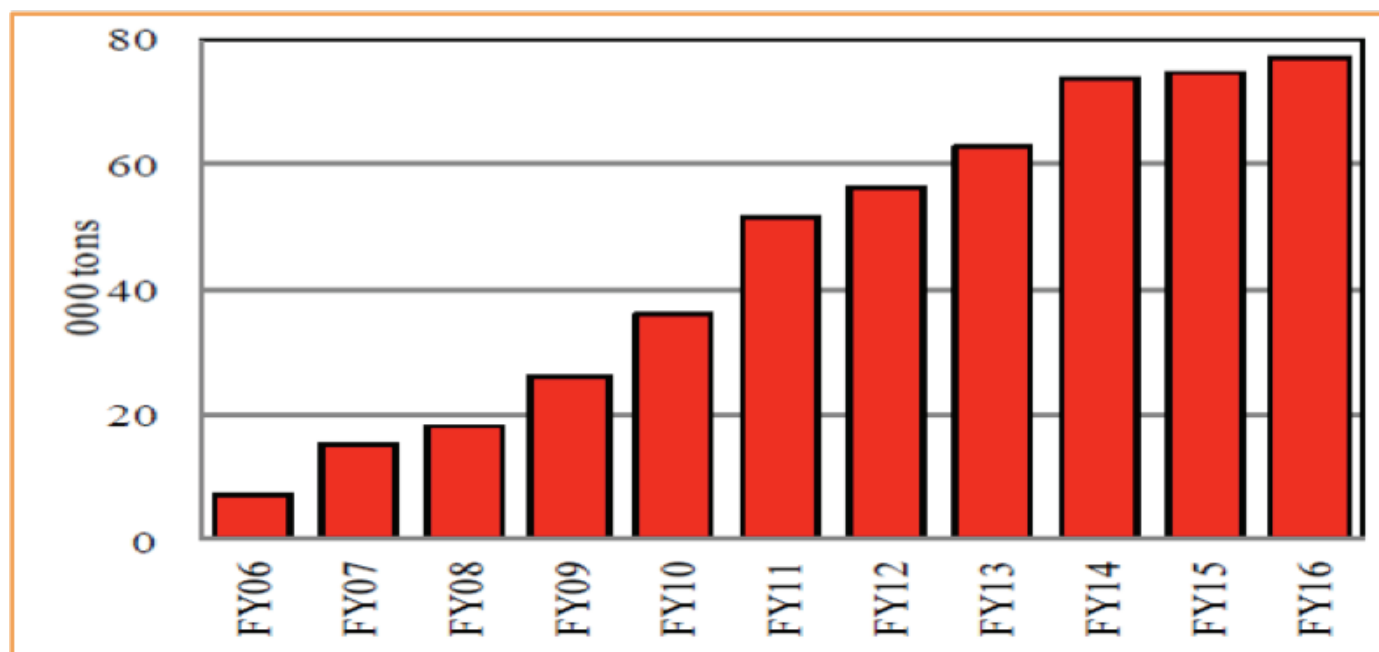


Source: Akram, W., & Henneberry, S. (2016). Consumption Patterns of Urban Punjab of Pakistan



Global Trade Outlook:

Export statistics of Pakistan:



Source: SBP-Annual Report, Pakistan Bureau of Statistics, (2016)

World Meat Market at a Glance (Million Tonnes):

	2014	2015 E	2016 F
Production	315.4	319.6	320.7
Bovine (Cattle) Meat	68.0	67.9	68.4
Poultry Meat	111.0	114.9	116.2
Pigmeat	116.9	117.2	116.4
Ovine (Sheep) meat	13.9	14.0	14.1
World Per Capita Consumption (Kg/Year)	43.4	43.3	43.4
Trade Share of Production (%)	9.7	9.3	9.6

E: Estimated F: Forecast

Source: FAO-United Nations (2015-16)

*And thy Lord is Most Bounteous, Who teacheth by the pen,
Teacheth men that which he knew not. Al-Zuran*



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Chapter-4

CPEC – POTENTIAL FOR AGRICULTURE

CPEC – POTENTIAL FOR AGRICULTURE

4.1 CPEC – INTRODUCTION AND HISTORY

The China-Pakistan Economic Corridor (CPEC) is a collection of infrastructure projects, worth over \$ 56 Billion, currently under construction in Pakistan. CPEC can be viewed as the basis and foundation of a comprehensive strategic cooperation between China and Pakistan. The leadership of both countries has attached great significance to CPEC and has been working jointly to promote the project and ensure its successful completion. CPEC involves a variety of projects in different economic sectors. Energy projects, transport infrastructure projects, and Gwadar port city development form the major part of the investments under CPEC.

CPEC will help in improving the energy and transport infrastructure of Pakistan while helping China in achieving many of its strategic objectives, making the project a win-win situation for both countries. CPEC forms a vital part of the One Belt One Road (OBOR) initiative introduced by the Chinese President Xi Jinping's Government.

The idea of constructing an economic corridor, linking Western China to the sea ports of Pakistan has been present since 1950, and was one of the reasons behind the construction of the Karakorum Highway. Work on the Karakorum Highway was started in the year 1959 and was completed in 1979. The highway links the Pakistani provinces of Punjab, KPK, and Gilgit-Baltistan to the Xinjiang region of China.

In 1993, the government of Pakistan initiated a feasibility study for developing a deep sea port at Gwadar in Baluchistan. The Chinese government's interest in Pakistan's sea ports and linking them with Western China was renewed and negotiations started between the governments of the two countries to commence construction work on the Gwadar port. China began construction of a deep sea port at Gwadar in 2002, the first phase of which was completed in 2006. Further development work on the port ceased thereafter owing to political instability in Pakistan.

The Gwadar port project in its current form was first proposed during the regime of General Pervez Musharraf but was postponed due to political turmoil in the country. Discussions on the project were started again during the government of Pakistan People's Party, when the Chinese Premier Li Keqiang visited Pakistan in 2013.

With elections in 2013, the government in Pakistan changed and Muhammad Nawaz Sharif became the country's Prime Minister. The new PML-N government continued negotiations with its Chinese counterparts regarding the economic corridor project.

The President of China, Xi Jinping visited Pakistan on a state visit in April' 2015. During his visit a memorandum of understanding to commence work on the China Pakistan Economic Corridor (CPEC) was signed, including projects worth a total of \$ 46 Billion. Some additional projects were added to the

portfolio of CPEC later on, and the total investment worth of the projects included in CPEC is currently over \$ 56 Billion, with further new projects still expected to be added to the portfolio.

Like all sectors of Pakistan's economy, CPEC will also have a positive impact on the agriculture sector of Pakistan. This chapter attempts to analyze the opportunities in CPEC for the development of the agriculture sector of Pakistan, based on which important recommendations are made later on.

- **CPEC - Development Phases:**

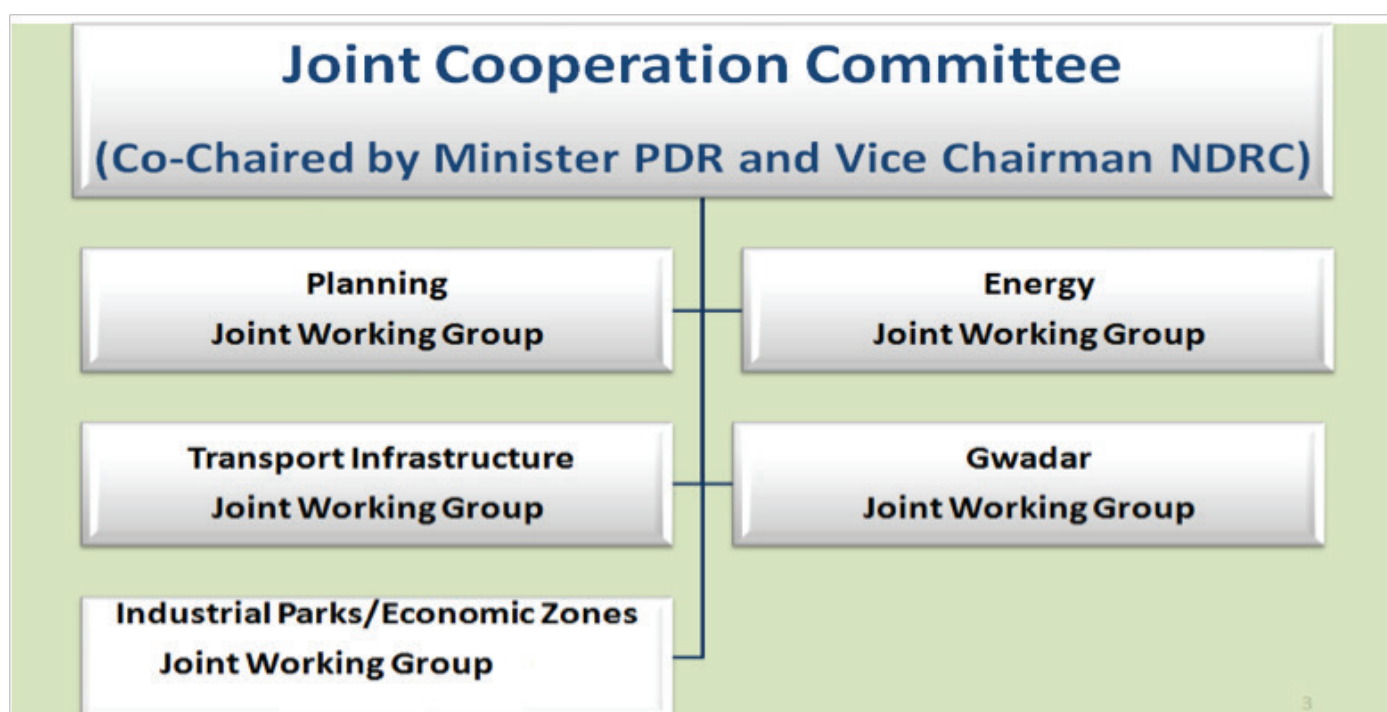
As per information from the Ministry of Planning, CPEC has three main phases of development as follows.

1. Short – term phase. (Expected completion: 2020)
2. Medium – term phase. (Expected completion: 2025)
3. Long – term phase. (Expected completion: 2030)

- **CPEC - Institutional Framework:**

All development work and decision-making regarding CPEC projects is overlooked by a Joint Coordination Committee (JCC) containing representatives from Pakistan and China. Pakistan is represented on the JCC by the Ministry of Planning and Development while China is represented by the National Development and Reform Commission (NDRC).

The JCC follows a 1+4 institutional framework for CPEC including joint working groups (JWG) for Planning, Transport Infrastructure, Energy, Industrial Cooperation, and Gwadar.

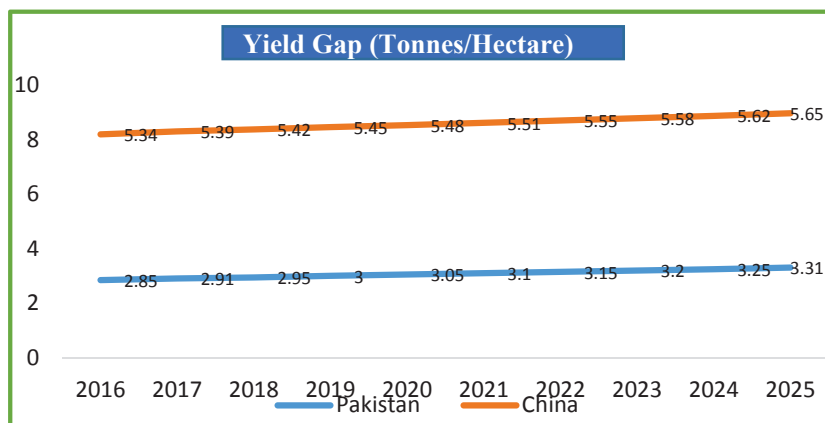


Source: Ministry of Planning, Development and Reform

4.2 MAJOR CROPS YIELD GAP WITH CHINA

4.2.1 Wheat Crop

Yield Projections (2016-2025):



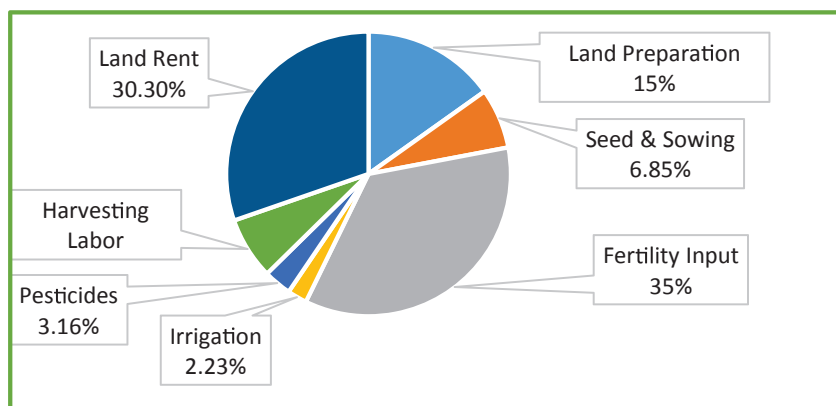
Source: OECD-FAO

Production Cost (Per Acre) of Wheat:

Activity	Cost/Acre
Land Preparation	1992
Seed Operation	2320
Sowing	2364
Irrigation	2920
Inter-culture	--
Plant Protection	1100
Fertilizer	7033.5
Harvesting	7203
Management Charges	840
Land Rent	9000
Income Tax	48.52
Total	34821.02

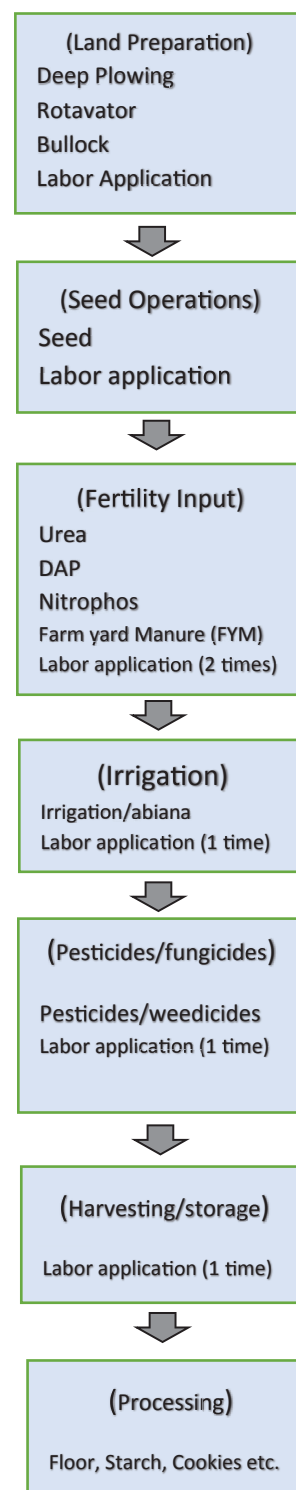
Source: Author's Estimation with Experts Discussions

Wheat Cost of Production (Percent):



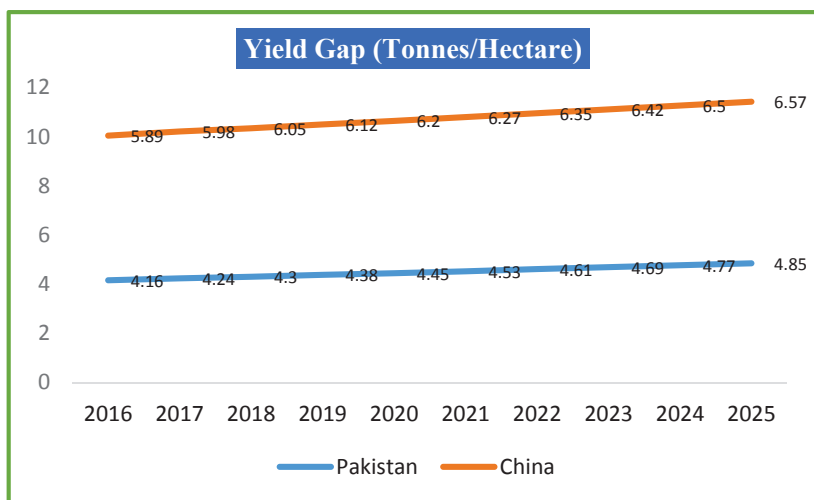
Source: Iqbal, M. et al. (2014). Effects of Various factors on Wheat Production. Sarhad J. Agri.

Flow Chart of Activities



4.2.2 Maize Crop

Yield Projections (2016-2025):



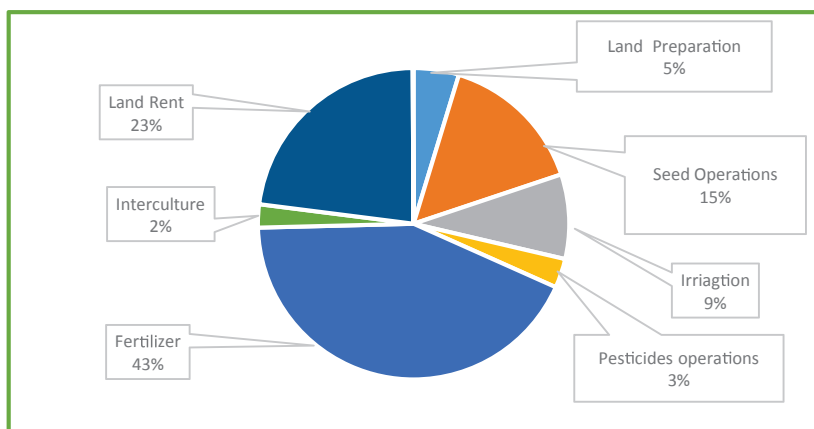
Source: OECD-FAO

Production Cost (Per Acre) of Maize:

Activity	Cost/Acre
Land Preparation	2320
Seed Operation	2088
Seed	6000
Irrigation	4878
Interculture	1700
Plant Protection	1637
Fertilizer	21818
Harvesting	3400
Management Charges	900
Land Rent	12500
Income Tax	48.52
Total	57289.52

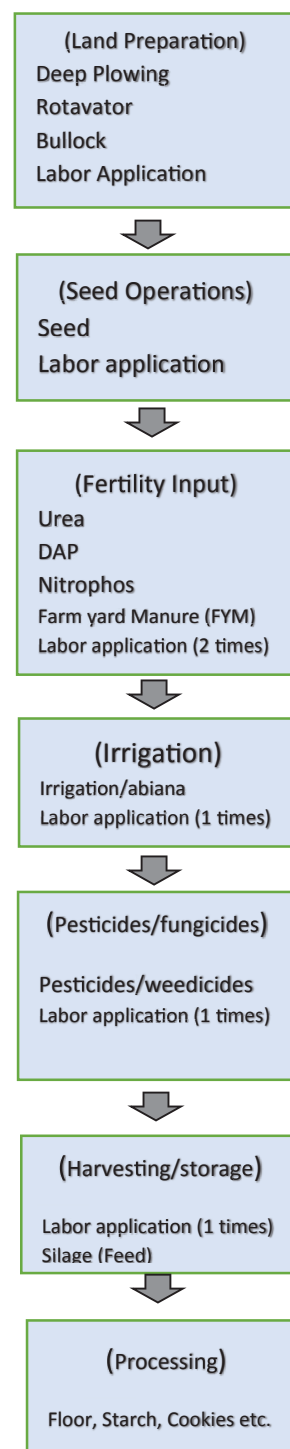
Source: Author's Estimation with Experts Discussions

Production Cost of Maize (Percent):



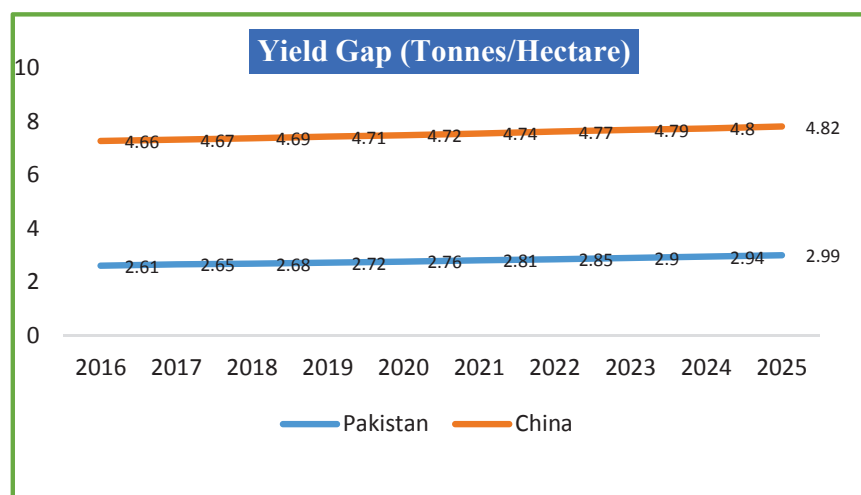
Source: Author's Estimation with Experts Discussions

Flow Chart of Activities



4.2.3 Rice Crop

Yield Projections (2016-2025):



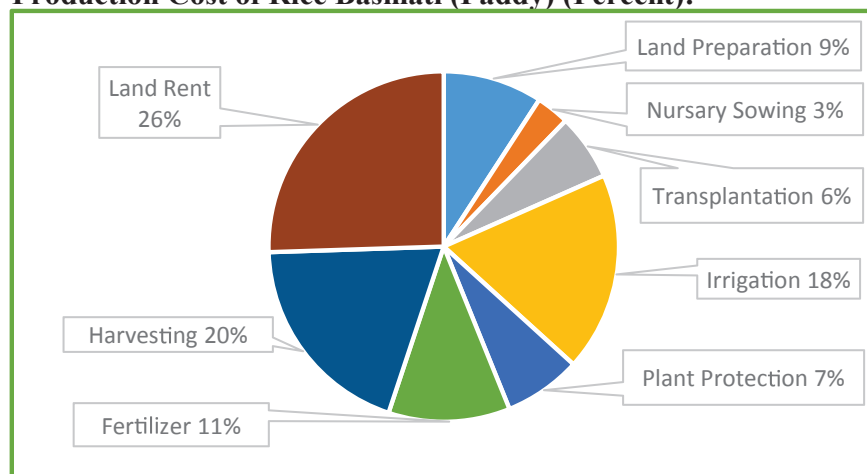
Source: OECD FAO

Production Cost (Per Acre) of Rice Basmati:

Activity	Cost/Acre
Land Preparation	4656
Nursery sowing	1200
Transplantation	2762.5
Irrigation	9156
Plant Protection (Nursery/Field)	3125
Fertilizer (Nursery/Field)	5511
Harvesting	8820
Management Charges	900
Land Rent	12500
Income Tax	48.52
Total	48679.02

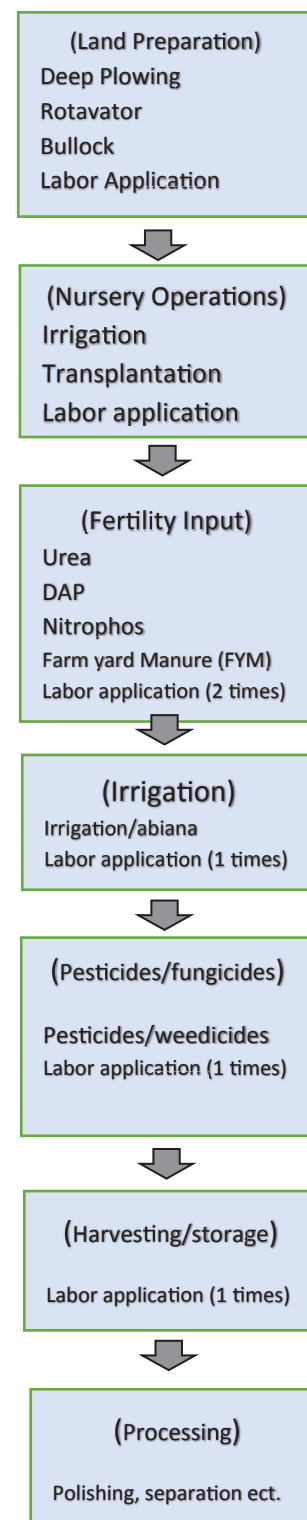
Source: Author's Estimation with Experts Discussions

Production Cost of Rice Basmati (Paddy) (Percent):



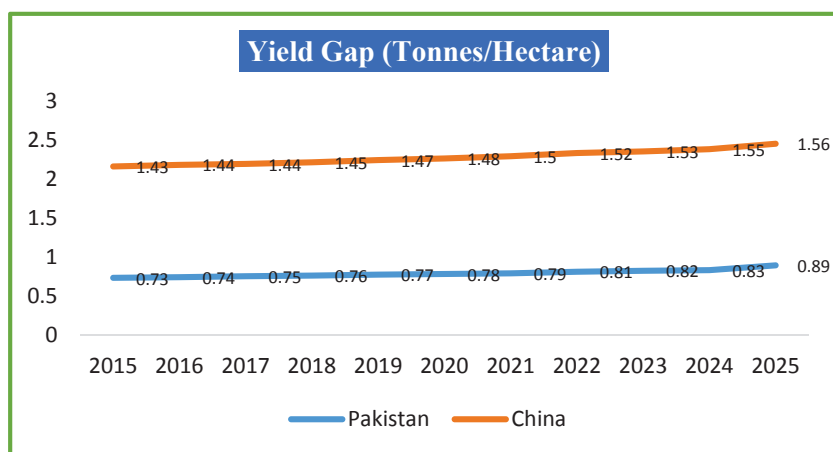
Source: Author's Estimation with Experts Discussions

Flow Chart of Activities



4.2.4 Cotton Crop

Yield Projections (2016-2025):



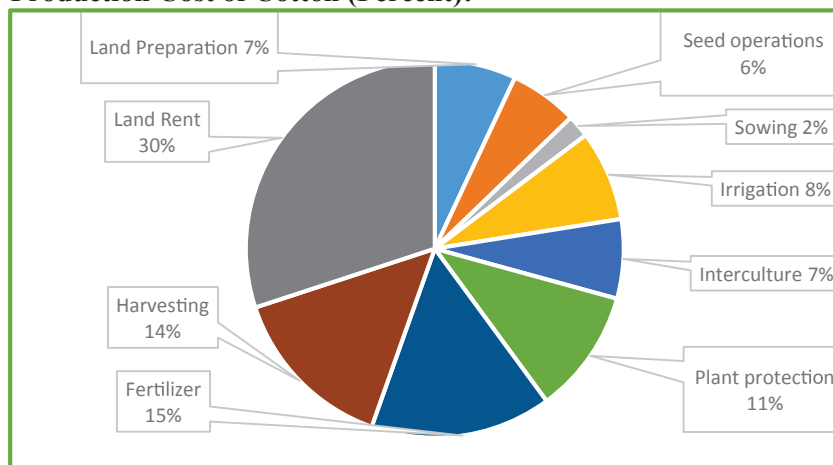
Source: OECD-FAO

Production Cost (Per Acre) of Cotton:

Activity	Cost/Acre
Land Preparation	3930
Seed Operation	2835
Sowing	690
Irrigation	4948
Interculture	3332
Plant Protection	5500
Fertilizer	8134
Harvesting	4840
Cutting of cotton sticks	1500
Management Charges	1200
Land Rent	16664
Income Tax	64.69
Total	53637.69

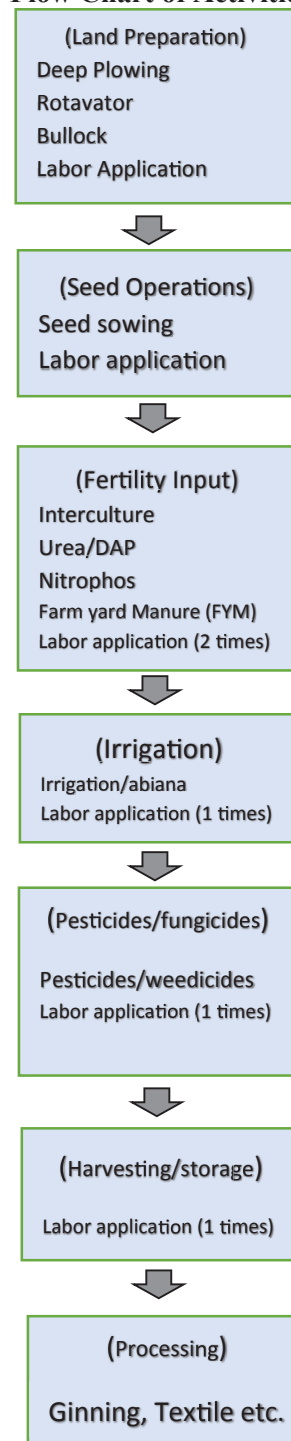
Source: Author's Estimation with Experts Discussions

Production Cost of Cotton (Percent):



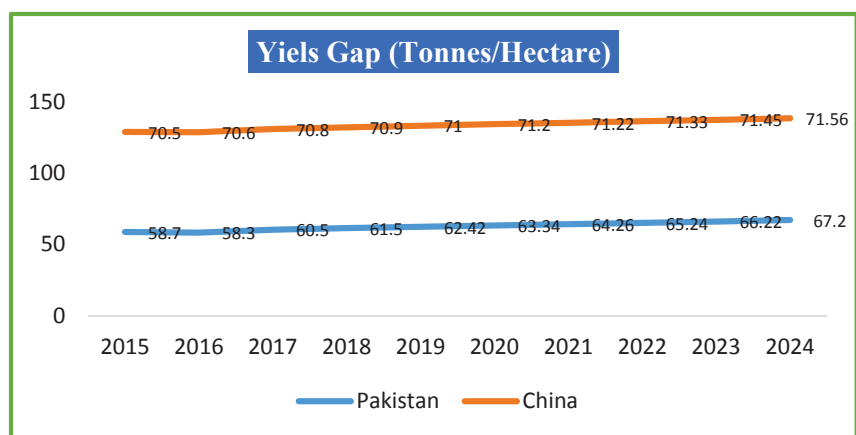
Source: Author's Estimation with Experts Discussions

Flow Chart of Activities



4.2.5 Sugarcane Crop

Yield Projections (2016-2025):



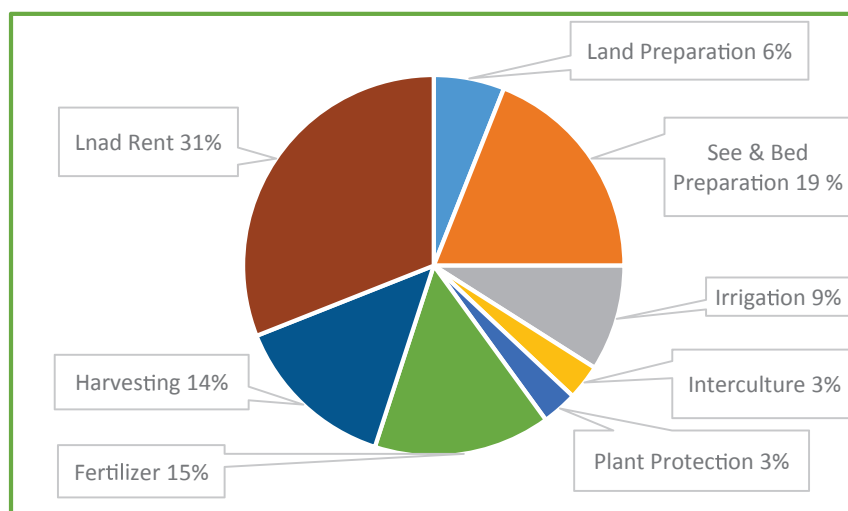
Source: OECD-FAO

Production Cost (Per Acre) of Cotton:

Activity	Cost/Acre
Land Preparation	4178
Seed & Bed Preparation	1740
Seed & Sowing	13792.5
Irrigation	7547.5
Interculture	1856
Plant Protection	1400
Fertilizer	11316.5
Harvesting	9225
Management Charges	1800
Land Rent	25000
Income Tax	97.04
Total	77952.54

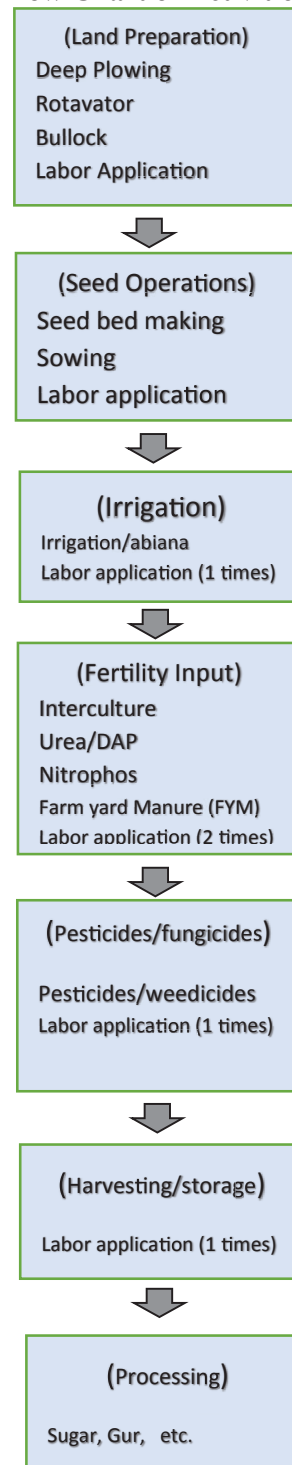
Source: Author's Estimation with Experts Discussions

Production Cost of Sugarcane (Percent):



Source: Author's Estimation with Experts Discussions

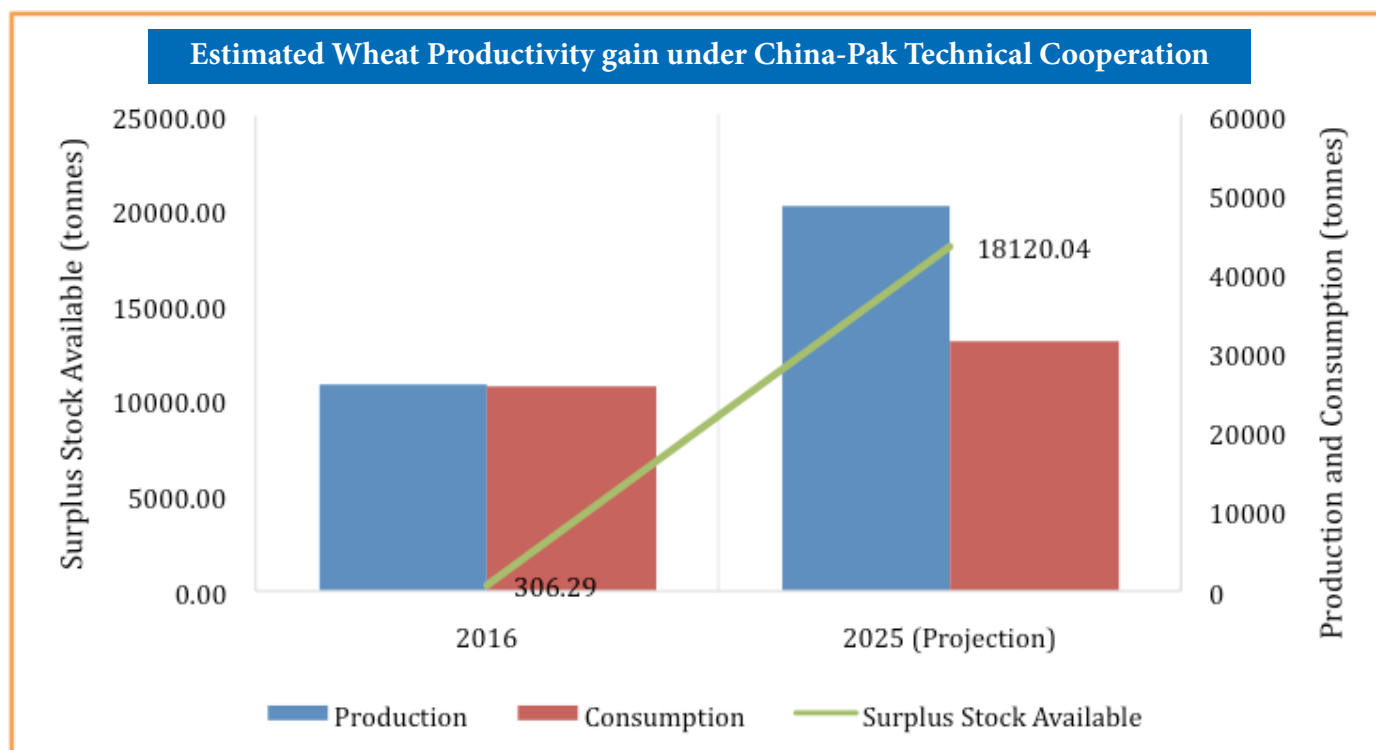
Flow Chart of Activities



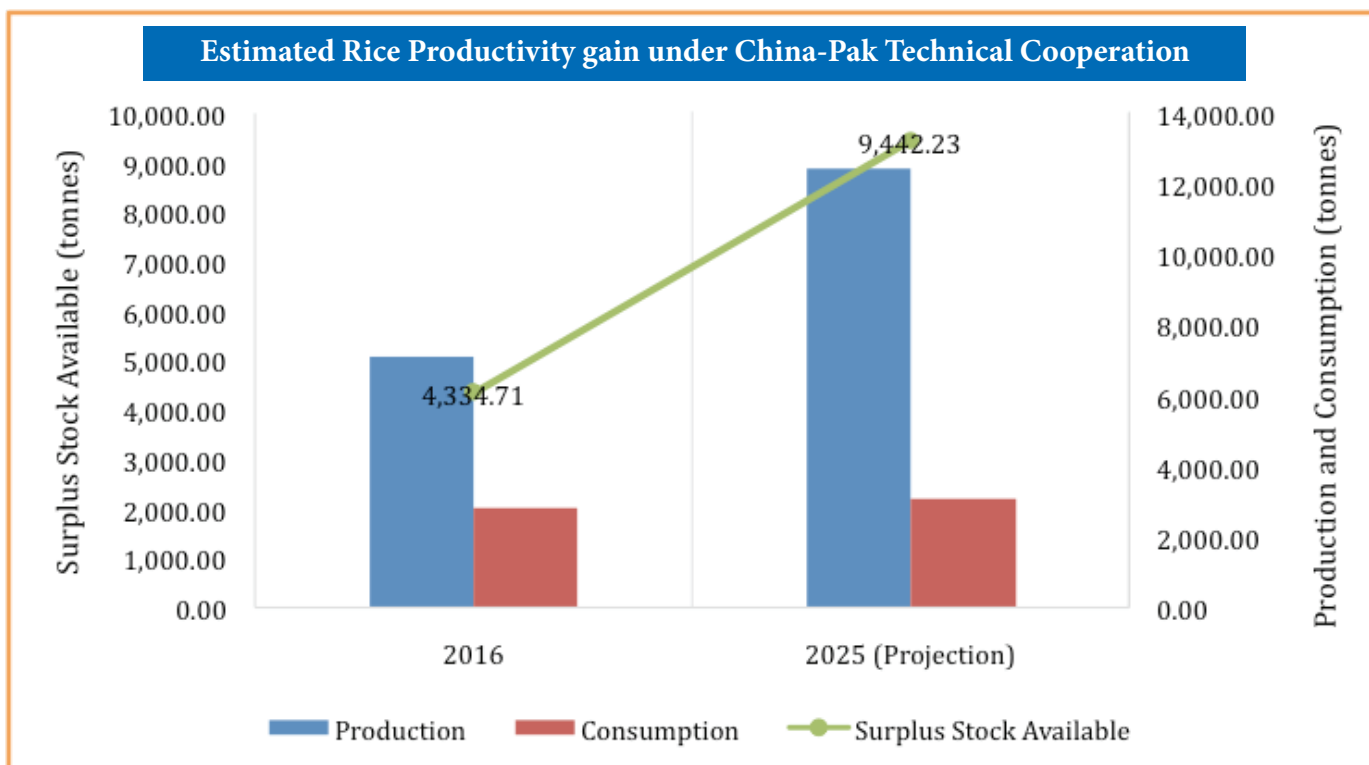
4.3 CPEC – OPPORTUNITIES FOR AGRICULTURE

4.3.1 Learning from Chinese Agricultural Practices:

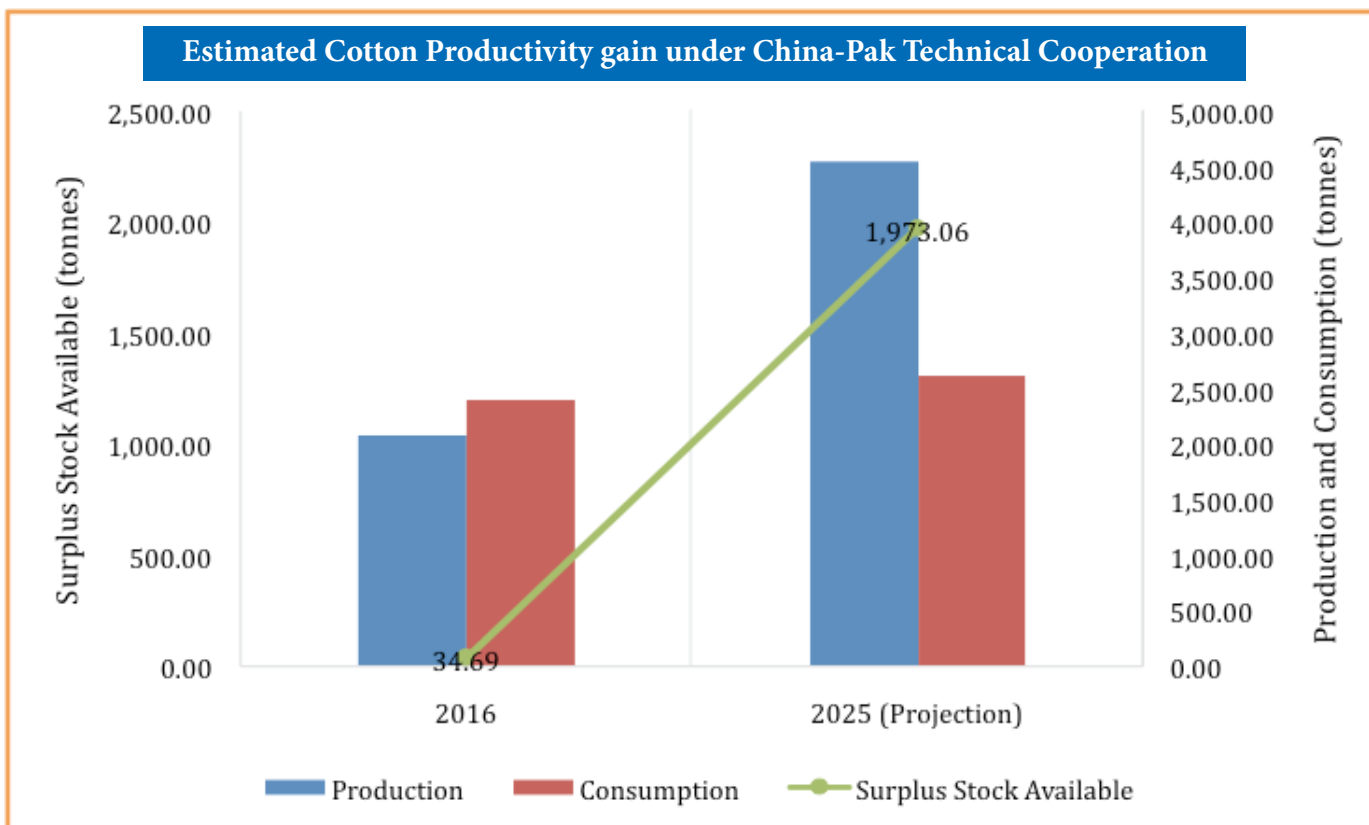
- As shown graphically in the preceding section, China's yield for all of the major crops is around twice the yield achieved in Pakistan. This shows that there is much room for improvement in the agricultural methods and technology being used in Pakistan for the production of various crops.
- Through CPEC, the socio-economic connectivity between Pakistan and China will increase substantially. Pakistani farmers and businessmen in the agriculture sector can use this increase in connectivity provided by CPEC, to learn in detail about the practices and technology used in China for the production of various crops.
- Through the adoption and application of Chinese farming practices and technology to farms in Pakistan, the domestic yield and thus output for most crops can be increased significantly, which will add to Pakistan's GDP growth rate.
- Figures A-D below, show graphically the estimated improvement in domestic production and surplus stock available of major crops, if Chinese farming practices are applied in domestic farms gradually by the year 2025, through joint cooperation under CPEC.



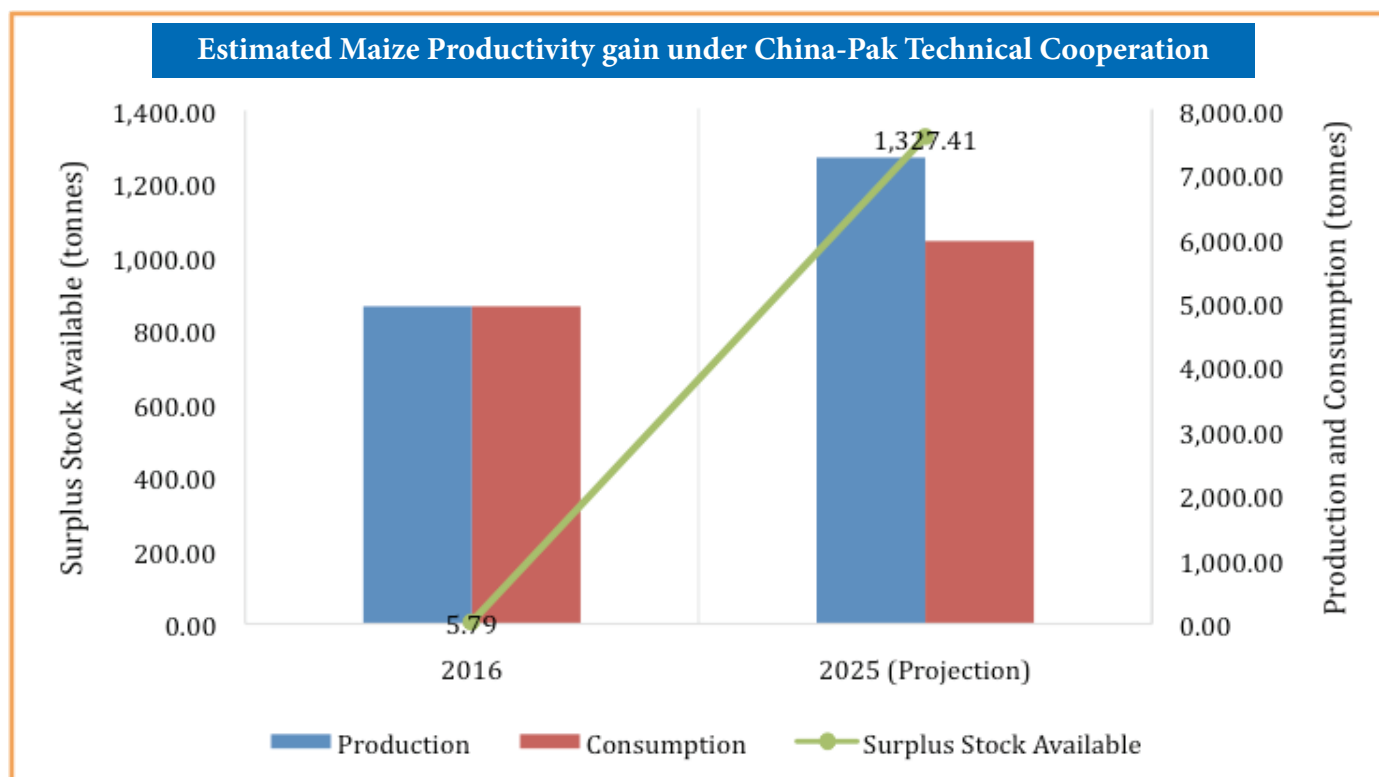
Source: Author's estimation with experts' discussion and OECD-FAO Agricultural Outlook (2016-2025)



Source: Author's estimation with experts' discussions and OECD-FAO Agricultural Outlook (2016-2025)



Source: Author's estimation with experts' discussions and OECD-FAO Agricultural Outlook (2016-2025)



Source: Author's estimation with experts' discussions and OECD-FAO Agricultural Outlook (2016-2025)

4.3.2 Opportunities for Agricultural Exports to China through CPEC:

- The increase in connectivity provided by CPEC, will also provide opportunities to increase exports of agricultural products from Pakistan to China.
- Having a population of more than 1.3 Billion, being the most populous country in the world, it is a great challenge for the Chinese government to fulfill the food requirements of its population, despite being the leading global producer of many food crops. This leads to a high amount of agricultural imports into China from other countries around the world.
- China spent more than US\$ 100 Billion on agricultural imports in 2016, which is around 5 times of Pakistan's total exports. Pakistan's share in Chinese agricultural imports continues to remain negligible as shown in Table – 1 on the following page. Through CPEC, there are huge opportunities for increasing agricultural exports from Pakistan to China.
- Agricultural exports from Pakistan to China will be beneficial for China due to the low transport costs between the two countries, whereas for Pakistan they will provide a boost to the country's total exports which have seen a declining trend over the past few years. The next few sections analyze in detail China's production, consumption, and imports of major agricultural products, to identify the potential for agricultural exports from Pakistan to China.

4.4 Pakistan's World Agricultural commodities exports:

S#	Commodity	Q/E.V	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
1	Wheat	Q	642.595	1136.95	42.863	-	-	457.800	29.700
		E.V	4361.62	7620.28	347.041	-	-	5862.200	446.700
2	Rice All	Q	1684.30	1820.00	1822.70	2891.300	3688.700	3129.100	2809.100
		E.V	27509.5	32432.8	36534.7	55392.20	69325.10	68285.90	117088.1
3	Rice Basmati	Q	550.033	716.726	816.339	814.857	839.000	907.900	1138.100
		E.V	15856.3	21077.2	24284.6	26073.64	28714.10	33732.70	68231.60
4	Rice Others	Q	1134.26	1103.25	1000.79	2014.666	2849.700	2221.200	1671.000
		E.V	11653.1	11355.6	12183.0	28507.82	40611.00	34553.20	48856.50
5	Sugar	Q	3.800	-	-	-	-	-	-
		E.V	76.699	-	-	-	-	-	-
6	Raw Cotton	Q	38.000	55.100	37.300	117.100	62.700	45.100	55.900
		E.V	1551.40	2872.60	2741.50	6549.300	4079.700	3047.800	4426.100
7	Red Chilli	Q	-	2.549	2.413	1.731	5.315	4.538	1.433
		E.V	-	120.334	110.548	96.287	238.198	260.301	114.404
8	Potato	Q	56.987	69.348	56.042	20.762	15.398	160.095	151.624
		E.V	373.575	398.498	334.359	183.998	173.211	1753.306	1540.889
9	Onion	Q	53.379	63.711	49.078	29.597	33.931	9.754	35.430
		E.V	332.887	355.751	364.592	221.886	333.802	93.391	468.167
10	Tomato	Q	0.234	2.413	1.566	0.224	4.965	0.525	0.997
		E.V	0.919	10.825	9.923	1.454	49.754	5.720	12.453
11	Garlic	Q	2.479	2.161	0.681	0.274	1.079	0.015	5.813
		E.V	94.575	48.831	11.720	9.172	47.568	1.005	121.583
12	Carrot & Turnip	Q	-	0.041	0.216	0.003	7.471	0.226	0.228
		E.V	-	0.261	1.205	0.050	65.471	4.051	11.520
13	Peas Fresh & Chillied	Q	0.049	0.065	0.329	0.024	0.023	0.191	0.771
		E.V	0.659	1.203	8.228	0.573	0.486	5.484	29.095
14	Kino	Q	121.692	94.806	149.587	74.508	189.286	122.760	214.765
		E.V	1278.67	1268.53	1771.34	1225.877	2337.895	1985.354	3323.547
15	Mango	Q	47.541	58.844	77.468	48.811	105.210	61.632	68.879
		E.V	861.087	1030.21	1348.84	945.513	1941.191	1204.736	1743.859
16	Apple Fresh	Q	0.818	0.250	0.097	0.100	0.146	0.428	0.020
		E.V	18.359	4.553	3.492	3.649	3.539	10.774	0.547
17	Bananas	Q	3.689	7.234	6.052	0.853	10.886	7.933	12.988
		E.V	11.330	41.276	39.744	7.137	94.902	73.601	86.064
18	Dated Fresh	Q	4.654	3.353	2.645	4.108	4.023	6.767	9.707
		E.V	127.611	96.735	73.953	120.725	160.881	290.708	133.498
19	Dated Dried	Q	72.817	67.791	62.784	79.946	85.326	97.323	0.493
		E.V	1567.24	1370.51	1235.05	1642.562	1780.124	2034.398	6.732

Source: Agriculture Market Information System (AMIS-2015-16)

Pakistan's World Agricultural commodities exports:

S#	Commodity	Q/E.V	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1	Wheat	Q	142.500	5.000	1707.704	413.673	169.403	20.037	10.441
		E.V	3064.700	61.300	50107.0	11177.800	5126.000	732.000	311.000
2	Rice All	Q	2729.400	4179.700	3679.285	3629.800	3407.688	3743.427	3786.111
		E.V	154762.9	183370.3	184319.0	184405.00	186623.00	222885.00	206254.00
3	Rice Basmati	Q	974.300	1032.300	1111.538	953.253	674.048	673.905	490.381
		E.V	83252.60	71770.20	81232.00	73711.000	64593.000	74635.000	59567.000
4	Rice Others	Q	1755.100	3147.500	2567.747	2676.569	2733.640	3069.522	3295.280
		E.V	71510.30	111600.1	103087.0	110694.00	122030.00	148250.00	146687.00
5	Sugar	Q	-	-	-	48.672	1064.0	649.050	708.968
		E.V	-	-	-	2575.0	51692.0	29711.0	32686.0
6	Raw Cotton	Q	78.200	160.100	144.300	256.540	92.500	114.790	95.017
		E.V	6826.500	16365.50	31168.40	41393.000	14882.000	21353.000	14937.000
7	Red Chilli	Q	2.218	3.585	0.882	0.425	3.977	2.093	2.076
		E.V	124.642	415.326	212.094	108.102	945.060	304.400	487.816
8	Potato	Q	315.158	245.329	426.482	272.800	456.185	254.818	347.421
		E.V	3286.640	4315.410	8489.951	6788.536	12290.294	7985.194	10295.660
9	Onion	Q	33.020	122.002	170.157	50.591	75.206	75.494	196.046
		E.V	432.555	1988.703	4128.181	687.079	1357.8	2011.3	3707.9
10	Tomato	Q	40.907	5.692	38.329	15.766	7.095	11.962	7.694
		E.V	412.663	76.909	1394.852	562.507	283.817	472.295	303.305
11	Garlic	Q	0.766	0.049	0.062	0.847	0.264	0.105	0.227
		E.V	22.760	6.303	11.728	78.307	25202.0	9.541	30.994
12	Carrot & Turnip	Q	0.473	0.010	0.170	0.036	0.036	0.024	0.005
		E.V	13.818	0.402	6.280	1.454	1.454	0.984	0.319
13	Peas Fresh & Chillied	Q	0.757	0.065	3.08159 6	0.968	0.225	0.605	0.213
		E.V	34.155	3.969	12 7.304	66.391	16.200	34.153	17.238
14	Kino	Q	176.745	360.625	303.452	416.183	342.391	353.723	393.310
		E.V	3557.224	8391.982	8596.604	15334.858	14563.316	15665.315	17385.956
15	Mango	Q	73.437	84.921	89.552	85.119	103.487	86.001	65.311
		E.V	2307.046	2522.400	2889.007	3271.913	4706.385	4976.675	4627.067
16	Apple Fresh	Q	2.278	1.573	1.329	1.449	1.280	0.521	0.807
		E.V	66.804	40.919	47.914	48.862	54.583	26.285	40.979
17	Bananas	Q	86.714	84.489	50.737	48.397	60.174	75.489	38.170
		E.V	865.875	1070.161	1774.527	1879.519	2407.918	2957.333	1617.504
18	Dated Fresh	Q	4.254	6.395	7.845	10.641	9.781	14.742	26.966
		E.V	146.979	364.243	623.756	951.607	703.473	1494.7	2091.8
19	Dated Dried	Q	5.618	115.286	104.879	133.731	146.343	151.708	88.832
		E.V	135.623	3783.118	3999.877	6054.4	6657.1	7507.2	6244.3

Source: Agriculture Market Information System (AMIS-2015-16



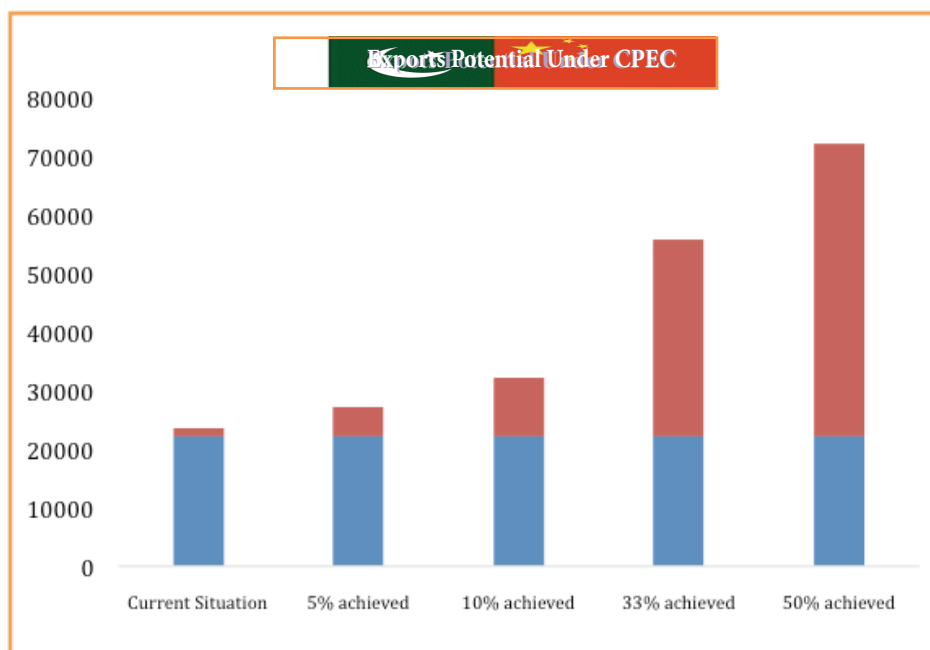
4.5 Pakistan's share in China's leading Agricultural Imports (\$ Millions, 2016)

Items	Total Imports by China	Imports from Pakistan	Pakistan's %age Share
Meat and meat products	10,259.00	0.044	0.00043
Fish, Aquatic animals & other products	6,907.00	51.80	0.74996
Dairy products, Eggs and Honey	3,516.00	-	0.00000
Vegetables	1,848.00	4.100	0.22186
Edible Fruits and Nuts	5,857.50	34.70	0.59240
Tea, Coffee and related products	668.00	0.042	0.00629
Wheat	801.00	-	0.00000
Rice	1,586.00	250.10	15.76923
Other Cereals	3,273.00	-	0.00000
Soya Beans	33,958.00	-	0.00000
Other Oil Seeds	4,316.00	1.370	0.03174
Fats and Oils	7,040.00	0.035	0.00050
Sugars and Confectionery	1,464.00	0.167	0.01141
Cotton and basic cotton products	7,738.00	1,033.00	13.3497
Wool and basic wool products	3,145.00	0.931	0.02960
Furskin and furskin articles	1,227.00	0.105	0.00856
Raw Hide & skins (other than furskins)	5,759.00	86.00	1.49331
Tobacco	1,728.00	-	0.00000
Total	101,090.50	1,462.40	1.457%

Source: World Bank Trade Statistics (2016)

Expected Impact of Agricultural Exports to China:

CPEC & Pakistan's Exports
(\$ Millions) Goal



- The figure above shows the expected impact of increasing agricultural exports to China under CPEC, on the total exports of Pakistan. Currently, we are exporting only \$ 1.46 Billion worth of agricultural products to China, which represents 1.457% of China's total agricultural imports, while our total exports of all commodities stand at around US\$ 22 Billion.
- The figure shows the impact of gradually increasing Pakistan's share in China's market for agricultural imports, from the current 1.457% to 5, 10, 33, and 50 percent respectively. For example, other exports remaining constant, a 33% share of Pakistan in China's agricultural imports can push the country's total exports to almost US\$ 60 Billion.
- The government of Pakistan, should develop a comprehensive policy for the gradual development of agriculture through CPEC by 2025, under the theme of 'CPEC – Agriculture Vision 2025'. This policy should be based on the opportunities identified and discussed in this chapter, for the sustainable growth of the agriculture sector through CPEC.

4.6 Ranking of World Countries by Total Exports (\$ Billions):

Rank	Country	Exports	% of GDP
1	 <u>China</u>	2,011	22.1
2	 <u>United States</u>	1,471	12.6
3	 <u>Germany</u>	1,283	46.8
4	 <u>Japan</u>	641.4	17.9
5	 <u>South Korea</u>	509	45.9
6	 <u>France</u>	505.4	30.0
7	 <u>Hong Kong</u>	487.7	201.6
8	 <u>Netherlands</u>	460.1	82.5
9	 <u>Italy</u>	436.3	30.1
10	 <u>United Kingdom</u>	412.1	27.2
11	 <u>Canada</u>	402.4	31.5
12	 <u>Mexico</u>	359.3	35.4
13	 <u>Singapore</u>	353.3	176.5
14	 <u>United Arab Emirates</u>	316	29.5
15	 <u>Taiwan</u>	314.8	
16	 <u>Switzerland</u>	301.1	97.4
17	 <u>India</u>	271.6	62.9
18	 <u>Spain</u>	266.3	33.1
19	 <u>Russia</u>	259.3	19.9
20	 <u>Belgium</u>	250.8	82.9
21	 <u>Saudi Arabia</u>	205.3	69.1
22	 <u>Thailand</u>	190	33.7
23	 <u>Brazil</u>	189.7	49.6
24	 <u>Poland</u>	188.3	13.0
25	 <u>Australia</u>	184.3	19.8
26	 <u>Malaysia</u>	175.7	70.9
27	 <u>Vietnam</u>	162.1	89.8
28	 <u>Turkey</u>	152	28.0
29	 <u>Sweden</u>	151.1	45.6
30	 <u>Indonesia</u>	148.4	21.1
31	 <u>Austria</u>	142.9	53.1
32	 <u>Czech Republic</u>	131	83.0
33	 <u>Ireland</u>	125.5	124.0
34	 <u>Norway</u>	102.9	37.4
35	 <u>Denmark</u>	95.98	53.4
36	 <u>Hungary</u>	89.4	90.7

Rank	Country	Exports	% of GDP
37	 <u>South Africa</u>	81.7	30.7
38	 <u>Qatar</u>	77.3	56.1
39	 <u>Slovakia</u>	73.2	93.5
40	 <u>Puerto Rico</u>	70.1	
41	 <u>Iran</u>	64.6	
42	 <u>Chile</u>	62.3	30.0
43	 <u>Finland</u>	61.3	36.6
44	 <u>Argentina</u>	65.9	11.1
45	 <u>Romania</u>	58.5	41.1
46	 <u>Israel</u>	56.3	30.7
47	 <u>Kuwait</u>	55.4	54.4
48	 <u>Iraq</u>	54.7	34.8
49	 <u>Portugal</u>	54.4	40.3
50	 <u>Kazakhstan</u>	46.3	28.5
51	 <u>Nigeria</u>	45.9	10.7
52	 <u>Philippines</u>	43.3	28.2
53	 <u>Venezuela</u>	38.5	
54	 <u>Colombia</u>	38.2	14.7
55	 <u>Algeria</u>	36.3	
56	 <u>Angola</u>	35.6	33.9
57	 <u>Ukraine</u>	35.5	52.8
58	 <u>Oman</u>	34.4	56.1
59	 <u>New Zealand</u>	34.5	
60	 <u>Peru</u>	34.2	21.3
61	 <u>Bangladesh</u>	31.8	17.3
62	 <u>Greece</u>	27.5	31.9
63	 <u>Slovenia</u>	26.7	77.9
64	 <u>Belarus</u>	26.2	60.0
65	 <u>Bulgaria</u>	24.7	64.1
65	 <u>Lithuania</u>	24.9	76.5
66	 <u>Pakistan</u>	23.7	10.6
67	 <u>Morocco</u>	21.2	34.3
68	 <u>Turkmenistan</u>	21.1	
69	 <u>Luxembourg</u>	20.9	213.8
70	 <u>Egypt</u>	20.9	13.2

Projected, If Goal achieved

Source: The World Bank (2016)

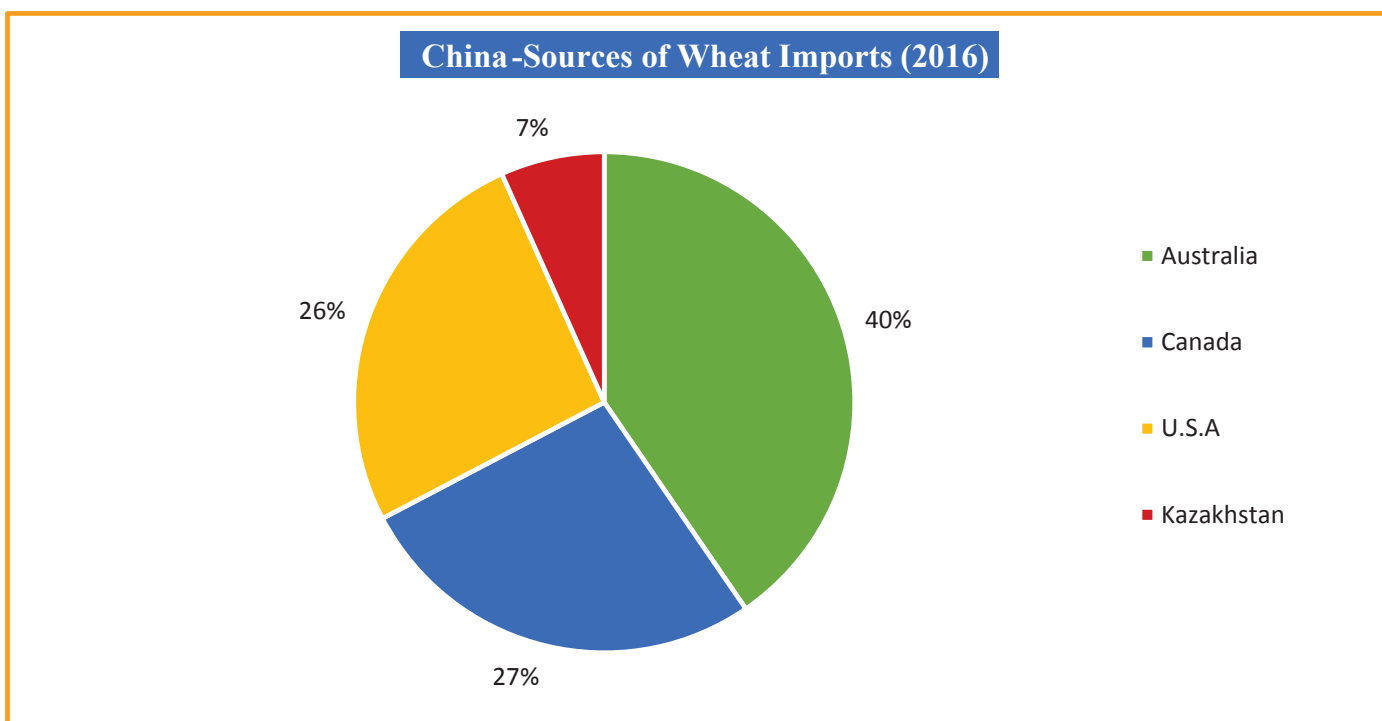


4.7 China's Major Agricultural Imports-An Overview

4.7.1 WHEAT – Imports by China

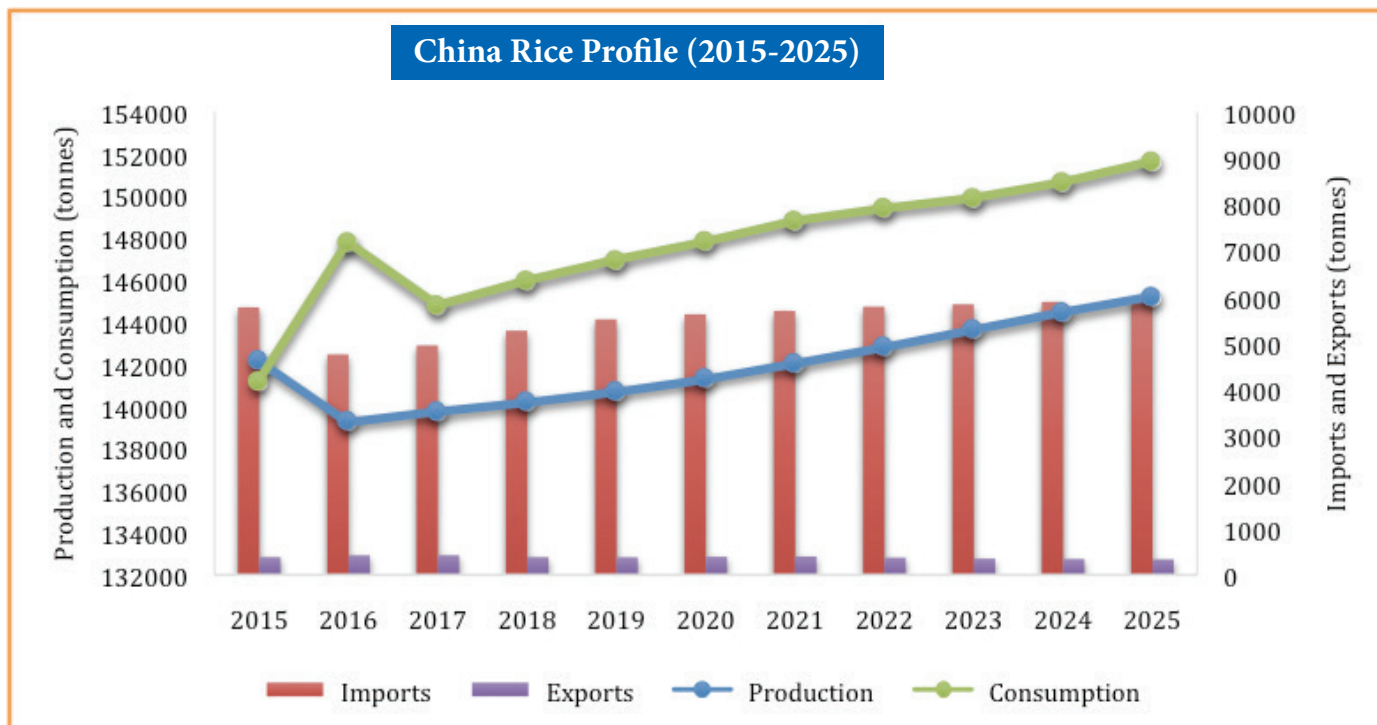


Source: OECD-FAO Agricultural Outlook (2016-2025)

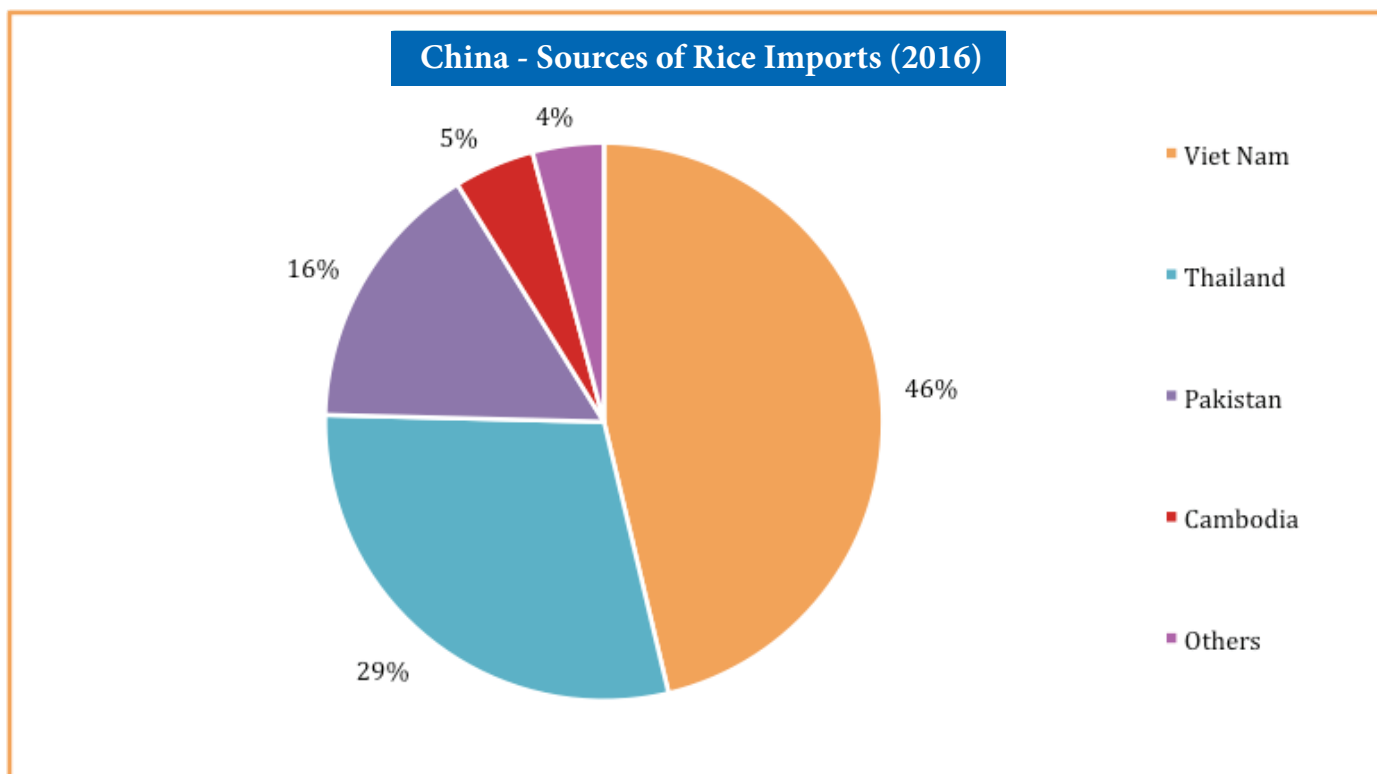


Source: World Bank Trade Statistics (2016)

4.7.2 RICE – Imports by China



Source: OECD-FAO Agricultural Outlook (2016-2025)

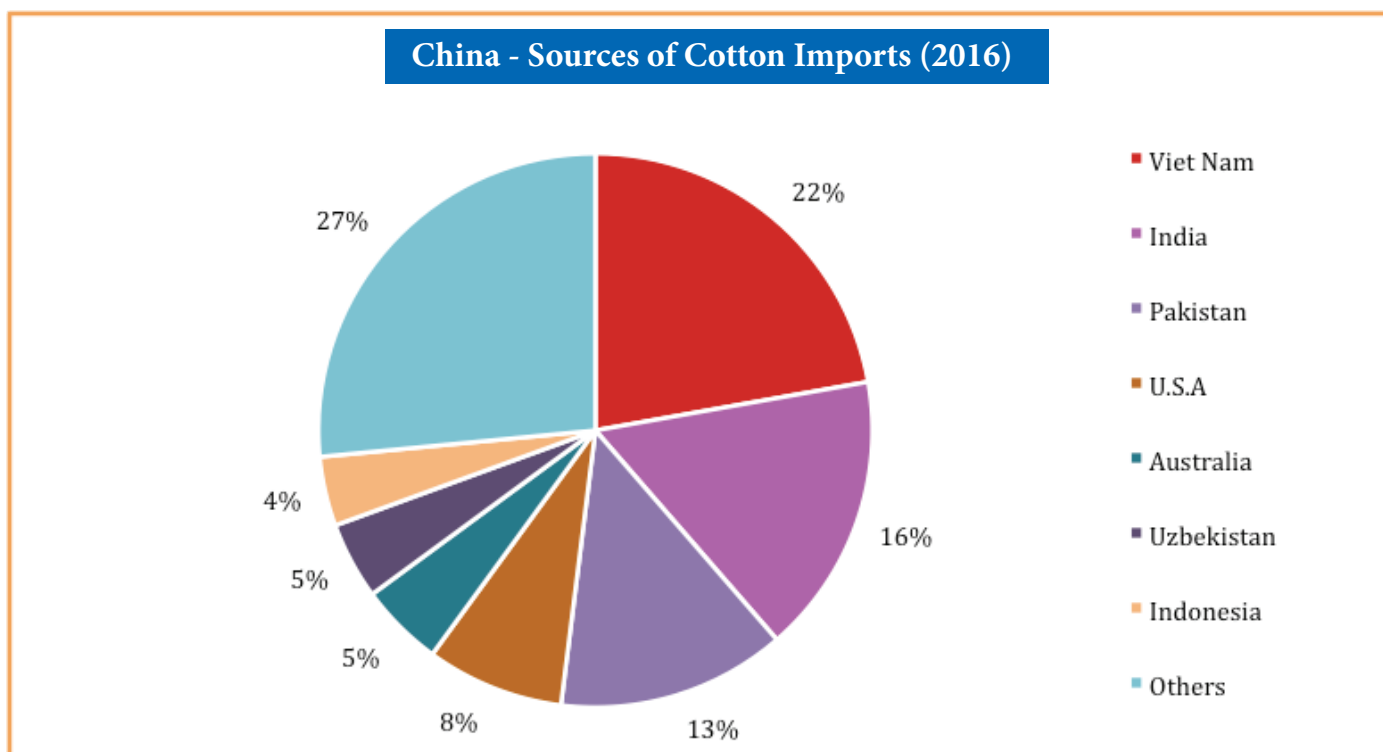


Source: World Bank Trade Statistics (2016)

4.7.3 COTTON – Imports by China

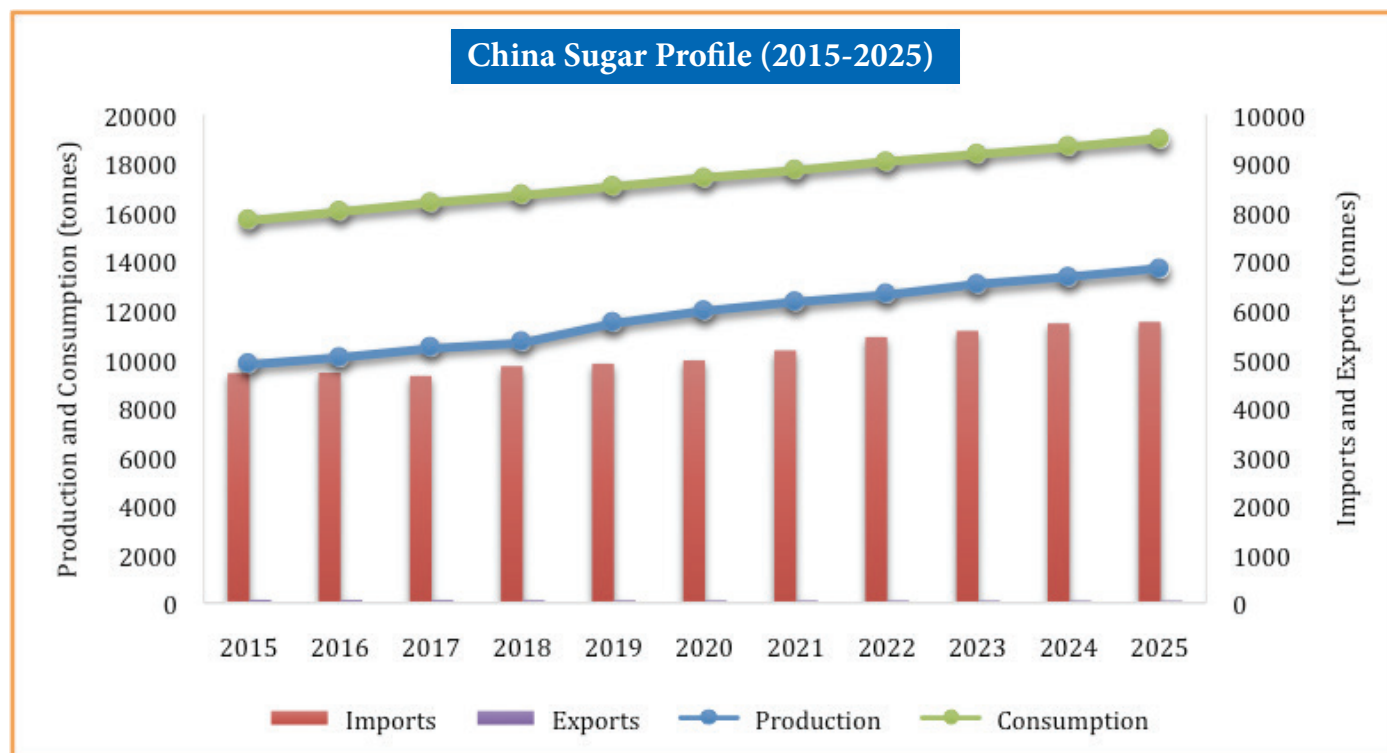


Source: OECD-FAO Agricultural Outlook (2016-2025)

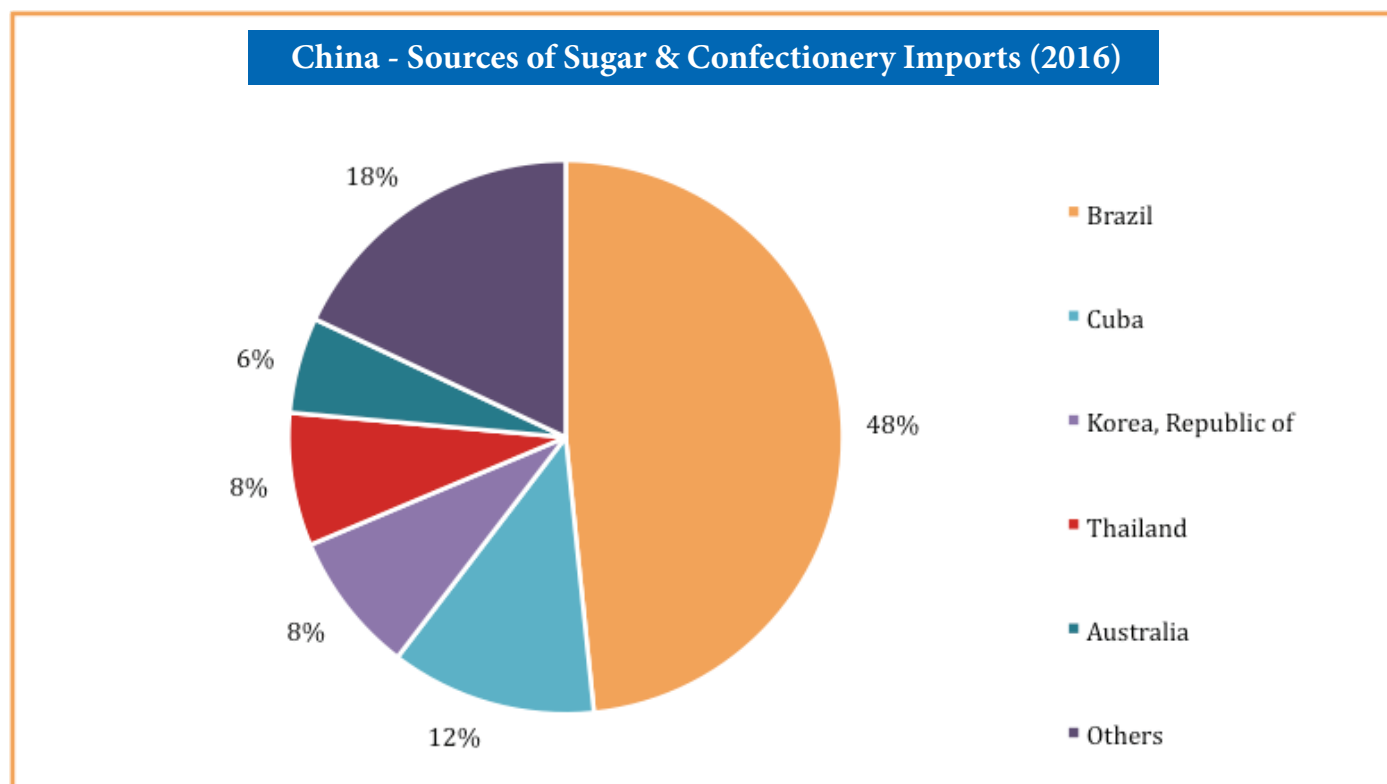


Source: World Bank Trade Statistics (2016)

4.7.4 SUGAR – Imports by China

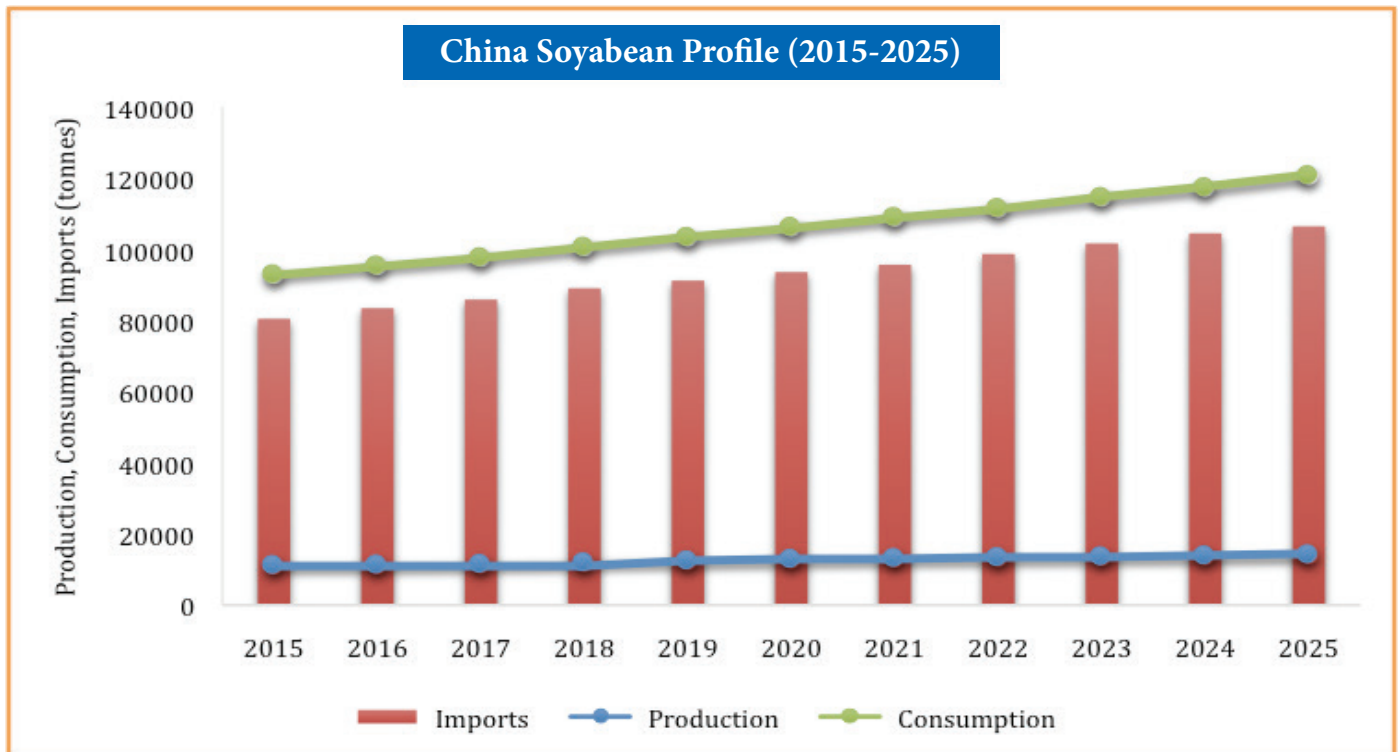


Source: OECD-FAO Agricultural Outlook (2016-2025)

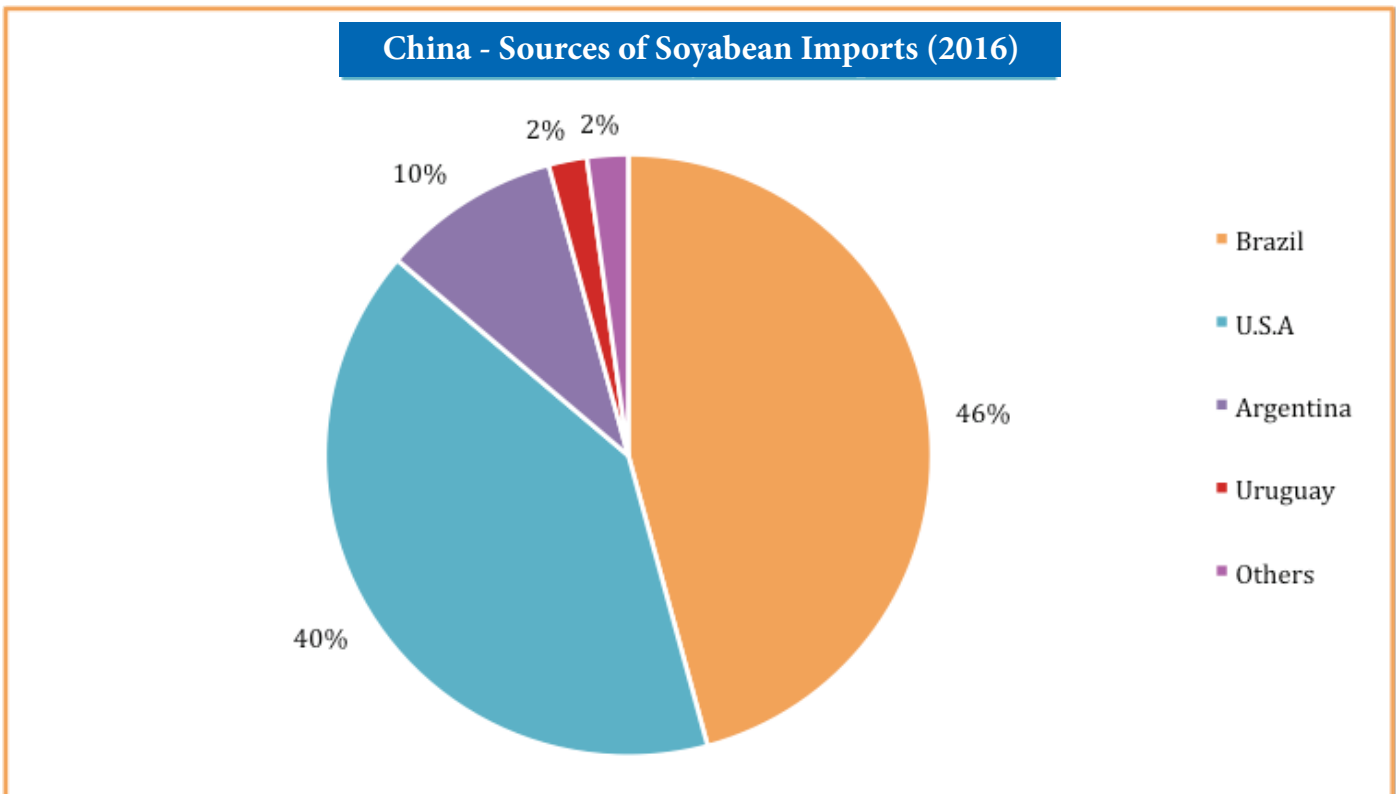


Source: World Bank Trade Statistics (2016)

4.7.5 SOYABEAN – Imports by China

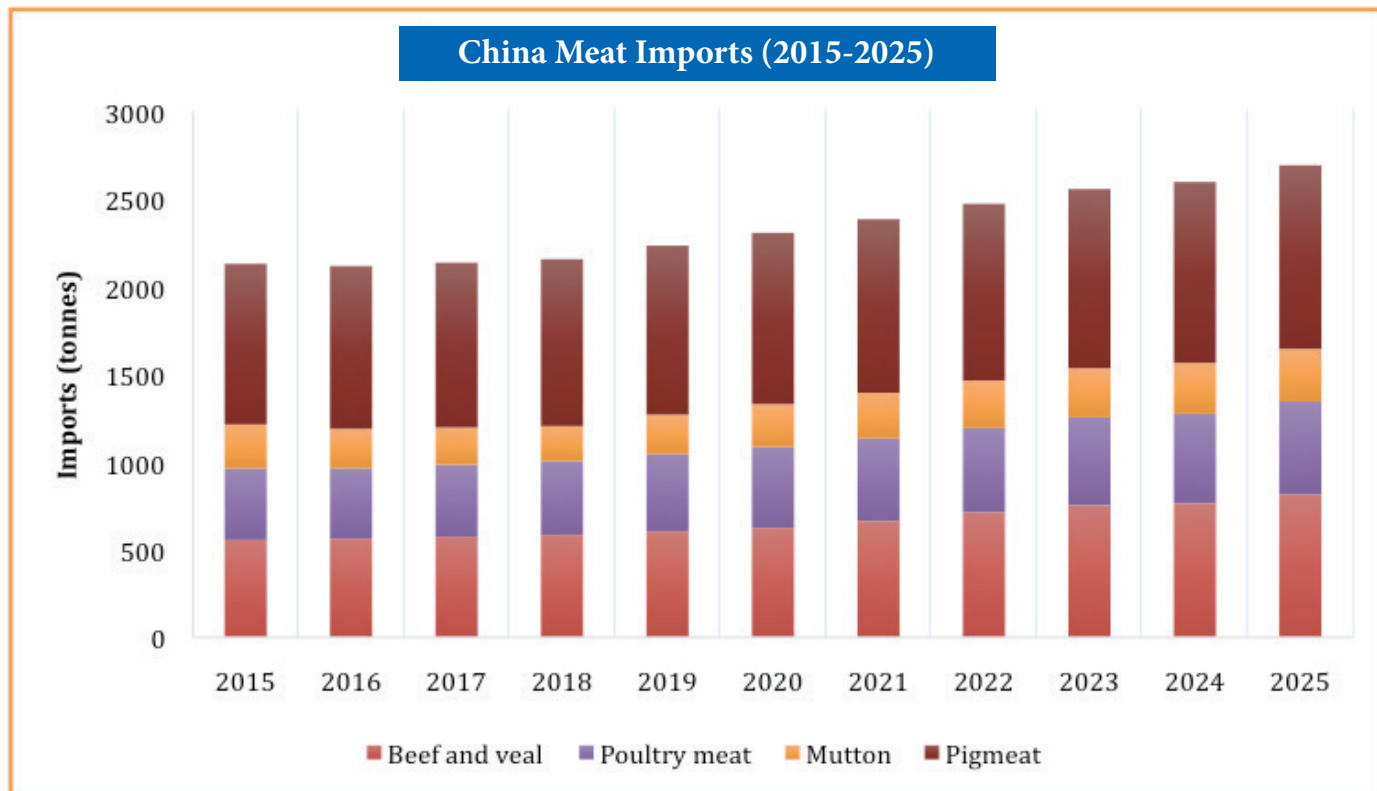


Source: OECD-FAO Agricultural Outlook (2016-2025)

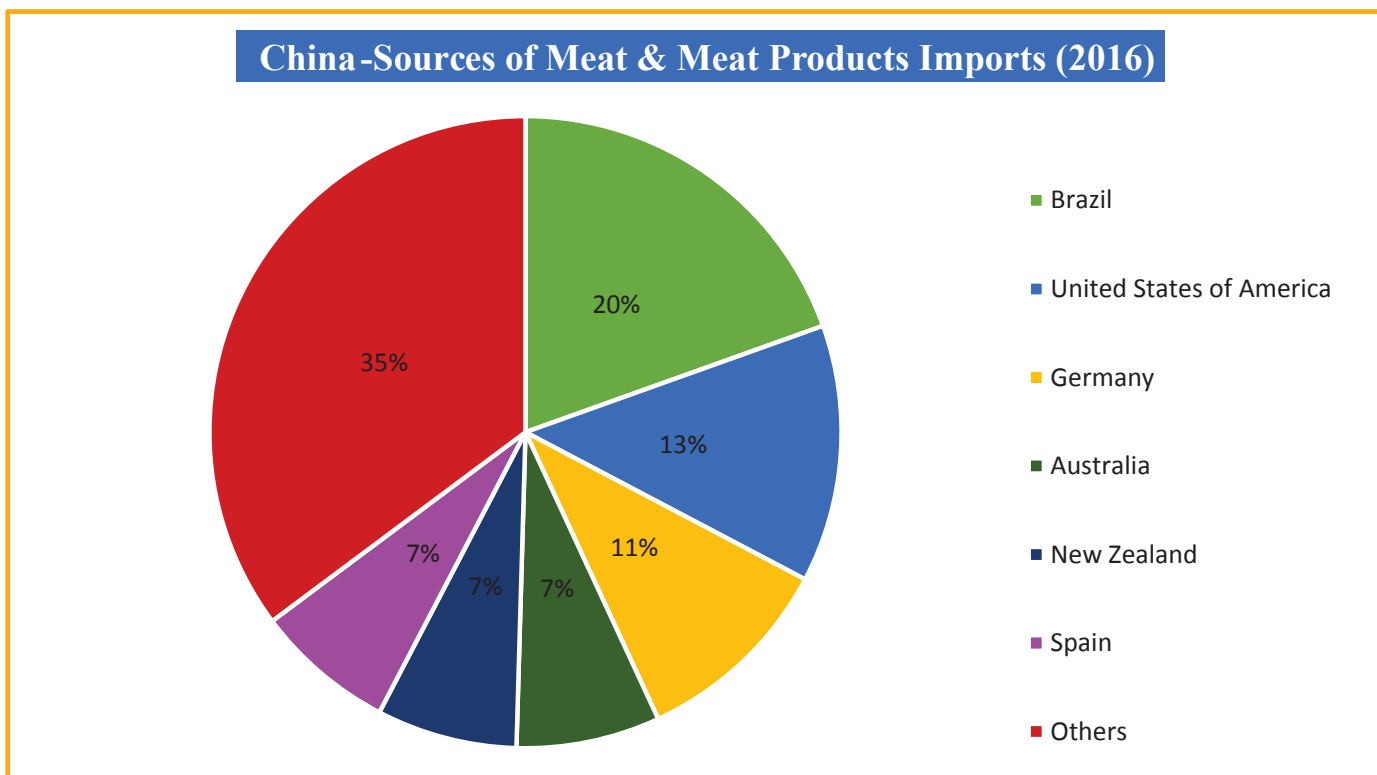


Source: World Bank Trade Statistics (2016)

4.7.6 MEAT & MEAT PRODUCTS – Imports by China

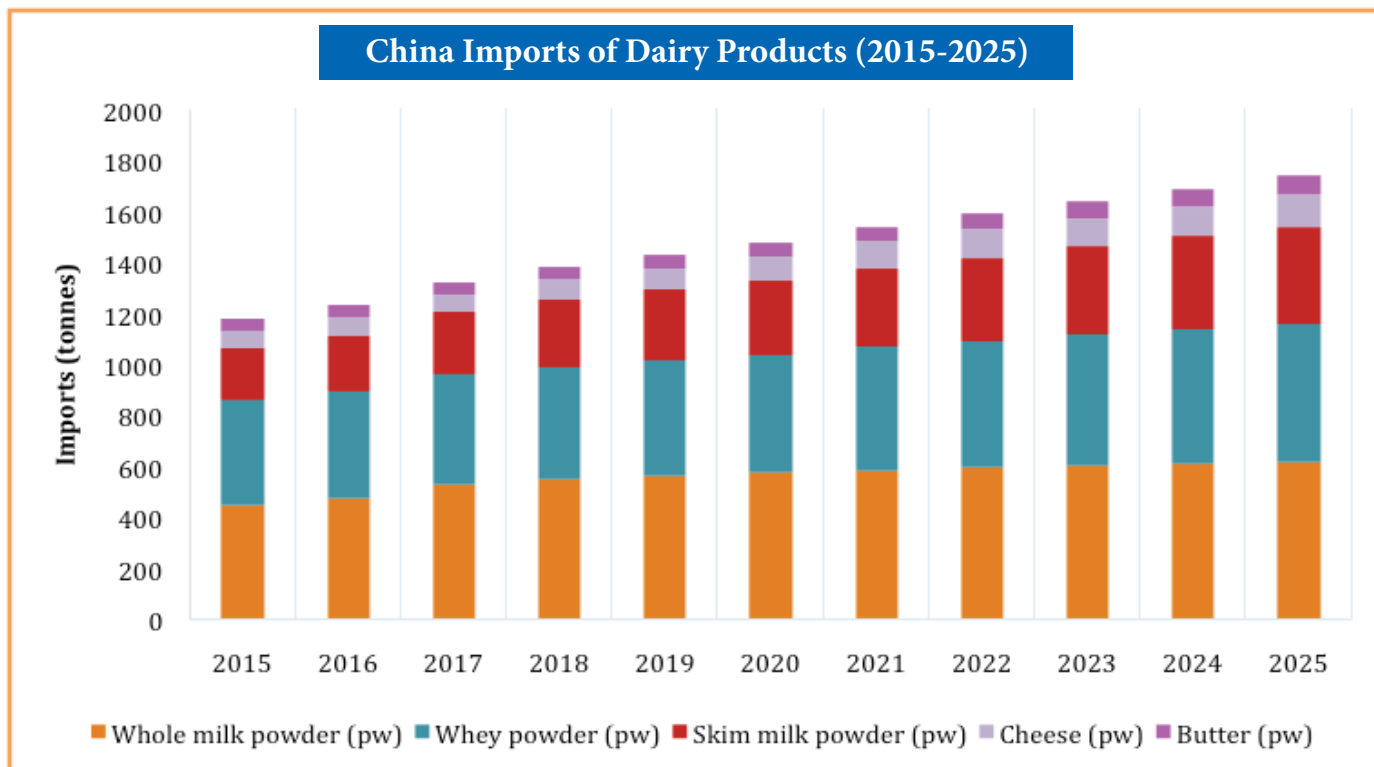


Source: OECD-FAO Agricultural Outlook (2016-2025)

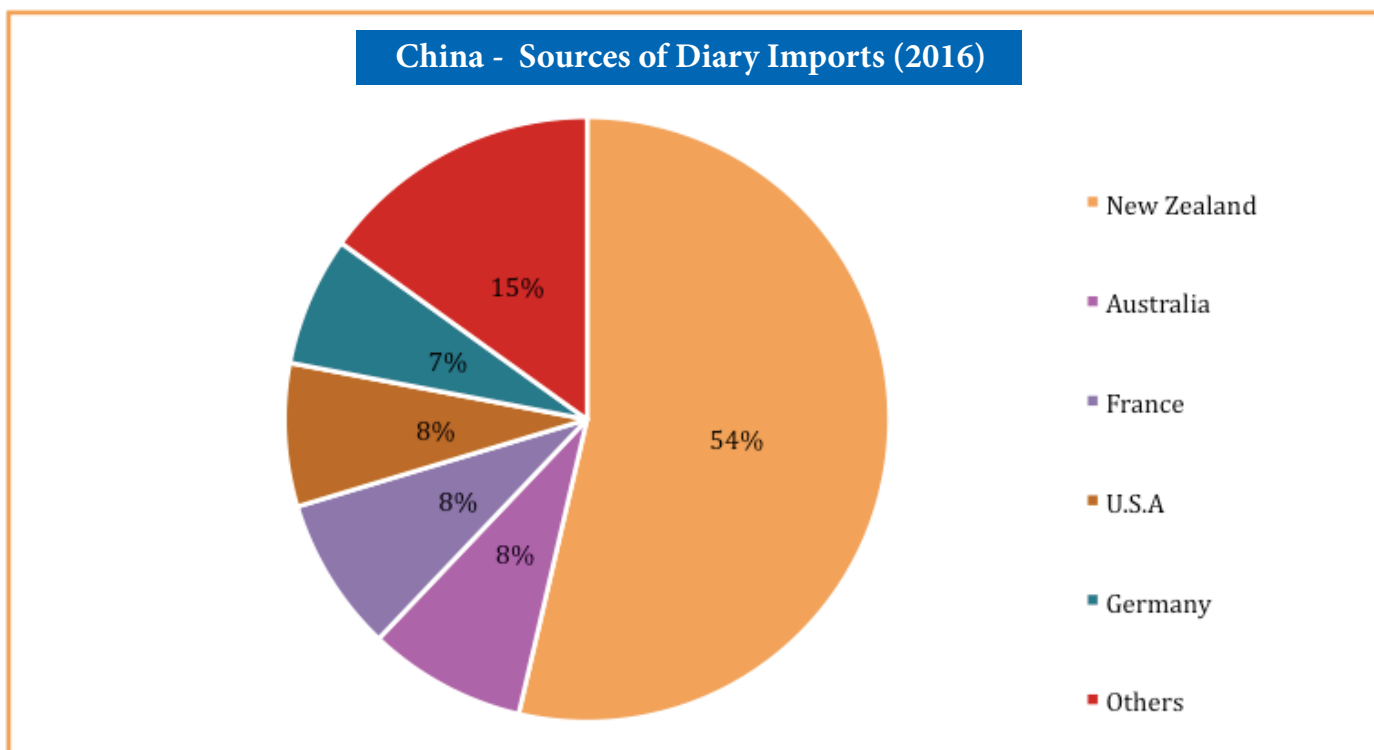


Source: World Bank Trade Statistics (2016)

4.7.7 DAIRY PRODUCTS – Imports by China



Source: OECD-FAO Agricultural Outlook (2016-2025)



Source: World Bank Trade Statistics (2016)



**Sitara Chemical
Industries Ltd.**

**The Largest Chlor-Alkali Plant
offers
The Best Chemical Products**

Caustic Soda produced through electrolysis!



BASIC CHEMICALS:

1. CAUSTIC SODA LIQUID (50%min) / Bulk Supply in SS tankers
2. CAUSTIC SODA FLAKES (99% min on dry basis) / 25kg PP bag
3. HYDROCHLORIC ACID (34±1%) / Bulk Supply in tankers
4. SODIUM HYPOCHLORITE (Free Cl₂:19~20%) / Bulk Supply in Rubber Lined / Fiber reinforced Plastic tankers.
5. LIQUID CHLORINE (99.9%) / Supply in Cylinders (900kg)
6. BLEACHING POWDER (30±1%) (Commercial Grade) /25kg PP bag & 30 kg drum

SPECIALTY CHEMICALS:

CALCIUM CHLORIDE (77% min) 25kg PP bag, 94% min
MAGNESIUM CHLORIDE-WHITE (98% min) 25kg PP bag
FERRIC CHLORIDE (Liquid 40±2%) / Bulk Supply in tankers / Customer own drums
NICKEL SULPHATE (22% min as Nickel) / 5 PE bag
ALUMINUM SULPHATE (13-15% as Al₂O₃)
MAGNESIUM SULPHATE (48% min as MgSO₄) 50kg polypropylene bags



GASES:

Carbon Dioxide (99.99%)
Food Grade in accordance with international standard for Beverage and Technology



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Chapter-5

CONSTRAINTS FOR AGRICULTURE IN PAKISTAN

CONSTRAINTS FOR AGRICULTURE IN PAKISTAN

Agriculture is the foundation for Pakistan's economy but still faces a number of constraints. The major constraints are environmental constraints, agronomical constraints, public and private level institutional constraints, socio-economic status of small farmer's community and their financial constraints, gaps between farmers and agricultural research institutions and the use of primitive technology and farming methods. Agriculture is directly affected by the natural environment and sudden natural disasters always lead to a significant losses in agricultural output. Heavy floods and rain caused a loss of around Rs14.409bn to the cotton crop in 2015. A similar trend was also seen in the previous years with the worst impact of Rs.98.091bn in 2010 due to floods (GOP-2016).

5.1 General Constraints:

The following constraints are faced generally in the agriculture sector in Pakistan.

5.1.1 Spending on Agricultural Research:

Investment in agriculture can accelerate the agricultural productivity and research activities, which can in turn create a significant impact in enhancing agricultural production. Pakistan is spending only 0.1 percent of its GDP on agriculture research, "while India utilizes four times more than us" (Dr. Iqar, VC, UAF, Dawn, 17 April-2017).

5.1.2 Lack of Value Addition:

A concrete value chain system helps to boost production and profitability. There is a dire need to improve existing agro-processing firms to enable them to undertake higher value addition in locally produced commodities. Pakistan's agro-processing industry reveals that lack of finances coupled with poor technology is curtailing full utilization of agro-processing potential. The existing structural inefficiencies in processing industries with respect to the functioning of value chains need to be eliminated, especially in the ancillary sectors of agri-business such as packaging, labelling branding, and marketing.

5.1.3 Low and stagnating Yield:

The per-acre yield of various crops has stagnated over the past few years, like the yield of cotton crop has been declining since 1991, which has left the country with no choice but to import cotton to meet the domestic demand. The only reason for this was non-introduction of new varieties and new technology.

5.1.4 Price Fluctuation:

The price of a commodity affects its efficiency in terms of output value losses to producer as well as to the economy (Eckert, 1990). In Pakistan, procurement prices of wheat, cotton, and rice are in general lesser than those prevailing in the domestic (open) and international markets. Rice occupies a prominent place in Pakistan's economy. Its importance lies not only in providing food to the people but also as a valuable source of foreign exchange earnings. Almost 30 to 45% of rice production is exported, especially the fine high quality rice. Despite the significance of rice for Pakistan's economy, there has been wide divergence between relative domestic price and relative world market price of Basmati rice.

5.1.5 Supply Chain Issues:

Agricultural produce supply chain management (SCM) is a system by which organizations, people, activities, information, and resources are involved in moving an agricultural commodity or service from producer to the end customer. In Pakistan, unfortunately the supply chain management system for most crops is weak. Awareness and exposure of the concerned stakeholders about the importance of SCM is essential for a successful SCM system. The domestic agricultural stakeholders mostly are not well aware about SCM, and its benefits.

5.1.6 Lack of Certified Seeds:

Seed is the starting point for successful crop production and its quality is of great significance to improve the final crop's output, yield, and quality. A healthy seed can produce a crop that has resistance against pests and other environmental and agronomical obstacles. Certified seeds can provide a sound base to bridge the gap existing in average crop yields between Pakistan and other countries, which is necessary for sustainable agricultural production and national food security. Pakistan is self-sufficient to provide certified seeds to the farming community. The government of Pakistan has established the Federal Seed Certification & Registration Department (FSC&RD) that has taken some policy measures/steps during 2015-16 including the registration of seed companies/plant varieties, filed crop inspection, seed sampling and testing, and seed imports up to some extent. The Plant Breeders' Rights Bill 2016 has in principle been approved by the National Assembly Standing Committee on Agriculture and the Cabinet Secretariat.

5.1.7 Scarcity of skilled Labor:

Labor has high importance in agriculture, and farms can become more profitable if skilled labor is employed. One of the major differences between China and Pakistan's agriculture is that in China, there is high emphasis on skilled labor and all family members are engaged practically in the fields. In order to improve the performance of the agriculture sector, it is important to provide skills to the rural labor force, and engage only skilled workers in the farming process.

5.1.8 Irrigation System Issues:

Pakistan is a semi-arid to arid country, and rainfall is not sufficient for crops to be grown without irrigation particularly in South Punjab and Sindh. Thus, an extensive irrigation system was developed in Pakistan as the Indus Basin Irrigation System (IBIS), which is the largest continuous irrigation system in the world. Lining of irrigation canals and distributaries and effective management of on-farm water channels is required to improve the irrigation system, and reduce wastage of water. Modern techniques like drip irrigation need to be made more common.

5.1.9 Energy Tariffs:

The energy policy of Pakistan is formulated by the federal and provincial governments, and the sources determine the financial prices of the usage of energy. Government-specific energy-efficiency incentive programs also play a significant role in the overall energy policy of Pakistan. Power tariffs are on a higher side which makes the tube-well irrigation expensive.

5.1.10 Primitive practices of farm mechanization:

Modern machinery is not being used by the farmers for agricultural operations like harvesting and threshing which is one of the primary reasons for low productivity of domestic farms. There is a need for implementing innovative ideas and advanced agricultural equipment in farms throughout Pakistan. Keeping in view the importance of farm mechanization, most developing countries are providing loans to facilitate the farmers for the adoption of advanced farm mechanization. By using the modern farming practices and equipment we can reduce cost of production, increase cultivatable areas, save time, resolve water-logging issues and provide relief to farmers by increase their efficiency.

5.1.11 Insufficient storage capacity:

Storage is an important part of agriculture that ensures consistent supply of agricultural produce to the end consumers, and ultimately strengthens the economy as a whole. Grain storage is primarily in the public sector and is the responsibility of the Pakistan Agricultural Storage and Services Corporation (PASSCO) as well as four provincial food departments. The shortage of grain storage facilities results in huge post-harvest losses that range from 15% to 35% and affects national agricultural output. However, the super floods of 2010 came as a shocking reality check and the public and the private sector began work on expanding grain storage facilities. The storage capacity for exports are also insufficient, and require huge investment as per international SOPs.

5.1.12 Lack Agricultural Finance:

Small land holders form a majority of the farming community in Pakistan, and they usually face financial constraints when looking to change their traditional ways of farming and adopt innovative ideas. Change in farm practices and technology requires huge levels of investment, which is not possible without adequate agricultural credit facilities. The GOP has taken some initiatives in the form of 'Kisan Package' that meets the financial needs of farmers to some extent but there is still much progress to be made, as most small landholders continue to remain outside the formal financial circle.

5.1.13 Cost of Inputs:

Seeds, fertilizer, pesticides are non-water agricultural inputs which significantly increase crop production and water-use efficiency. Their increasing cost, mishandling, adulteration and often non-availability at the right time are some of the major constraints which are seriously affecting agricultural productivity and performance.

5.1.14 Effective agricultural marketing strategy:

The agricultural marketing system in Pakistan has developed from an age-old traditional method to that characterized with a certain degree of scientific approach. Although this change has given appreciable dividends to the big farmers, the small ones are still vulnerable at the marketing stage; therefore being least benefitted by the change.

5.1.15 Unbearable taxis/duties:

For an agrarian economy like Pakistan, it is quite essential to provide the necessary incentives to the agriculture sector to maintain the vitality of the sector for the national economy. The current policies of taxes and duties put a huge part of the overall burden on small farmers. Better policies like the exemption

of customs duty and sales tax on rice processing machinery to boost value addition and export of rice, need to be designed and implemented.

5.1.16 Post-Harvest Losses:

The post-harvest system requires improvement in terms of the use of resources for research and development, particularly to reduce the level of post-harvest losses. These losses are attributed to a combination of factors during production and post-production operations. In case of fruits and vegetables, the range of post-harvest loss is between 30-35pc, whereas, for the Rice crop, post-harvest losses account for 40 percent of total losses. To eliminate these losses, farmers have to adopt modern techniques (Dr. Iqar, Dawn, 17 April-2017).

5.1.17 Insufficient access to agricultural information:

Agricultural information is a power which gives proper direction to the producers by providing a framework to identify the strengths and weaknesses of the current systems and improve their performance accordingly. A timely dissemination of support price and storage targets from the Govt. agencies can help producers to capture maximum financial benefit from this information.

5.1.18 Poor seedling nursery management:

There is a need for investment in best quality planting material at grass root level in the fields. Nurseries have great demand for the production of plants, bulbs, rhizomes, suckers & grafts. Generally in Pakistan, high quality & assured planting material at reasonable prices is not available.

Chapter-6

AGRICULTURE-A WAY FORWARD

AGRICULTURE-A WAY FORWARD

6.1 Government initiatives for strengthening the Agriculture sector

The government is focusing on improving agricultural productivity by increasing crop yield, systematic application of better inputs and advanced technology to enhance profitability of the farming community, improve competitiveness, and ensure the environmental sustainability of agriculture. The overall objective is to achieve a sustained agriculture growth rate of four to five percent per annum to support the overall GDP growth strategy.

6.1.1 Prime Minister's Agriculture Package (Rs 341 billion):

A mega relief package of Rs 341 billion has been announced by Prime Minister of Pakistan for small farmers including direct cash support and provision of soft agricultural loans. It is aimed at introducing progressive agriculture on scientific lines, reducing production cost of crops and making the small farmers prosperous. Under the package:

- Small farmers would get the chunk of Rs 147 billion as direct benefit while Rs 194 billion has been allocated for agricultural loans.
- The farmers cultivating rice and cotton at up to 12.5 acres of land would be given cash support of Rs 5,000 per acre. The government on this facility will bear the cost of Rs 20 billion each for rice and cotton crops.
- Announced setting up a Rs 20 billion fund to reduce prices of fertilizers which will lessen the price per bag of Potassium and Nitrate fertilizers. Also, the government was negotiating with local fertilizer manufacturers and gas companies to revert the increase in prices of fertilizers which has gone up by Rs 200 per bag.
- It has been decided to provide Liquefied Natural Gas (LNG) to fertilizer companies to overcome the shortages of gas supply.
- The government would bear the Rs 2.5 billion premium on the agricultural insurance which will benefit 0.7 million small farmers.
- Solar tube-wells would be provided on mark-up free loans to the farmers who own up to 12.5 acres of land. The mark-up of seven years would be paid by the federal government with a cost of Rs 14.5 billion. This would ensure a saving of Rs 1,600 and Rs 500 per day for the farmers running tube-wells on diesel for five hours daily and on petrol for the same duration, respectively.
- The electricity price for running tube-wells at peak hours has been fixed at Rs 10.35 per unit and Rs 8.85 at off peak hours. The sales tax on these bills amounting Rs 7 billion would be borne by the federal government.
- The custom duty, sales tax and withholding tax on the agriculture machinery has been reduced from 45 percent to 9 percent.
- The rice millers has been given full exemption on the turn-over tax for year 2015-16.
- The traders of agriculture commodities, fruits, vegetables and fish would get an exemption of three years on income tax while the sales tax on cold chain machinery has been reduced from 17 to 7 percent.
- The installation of production units of Halal meat, that have been be registered before December 31' 2016 will be given a four-year exemption on income tax.
- The government would provide Rs 30 billion as the fifty percent guarantee to banks on loans. This will benefit around 0.3 million farmer households through Rs 0.1 million each with collateral loans.
- The time-limit to pay back Rs 34 billion outstanding loan for the rice traders had been extended up to June 30, 2016.
- The government and the State Bank of Pakistan are working over reducing the mark-up rate on agricultural loans by two percent which would give a benefit of Rs 11 billion per annum to farmers.
- The Zarai Taraqati Bank Limited and commercial banks would provide one-window facilitation to the farmers seeking loans.
- The value of production units has been increased from Rs 2,000 to Rs 4,000 which would help farmers in obtaining double the amount of loan against their land value.
- A committee under the supervision of Federal Minister for National Food Security & Research has been set up which would work-out the ways to increase per acre yield and reduction of agriculture inputs.

Source: GOP (2015-16)

6.2 Recommendations for the Future:

- The government should revise land reforms by cluster analysis (CA) to eliminate feudalism and increase corporatization for the benefit of small land holders.
- The farmers claim that the cost of production has escalated at a much faster pace. The government should introduce innovation-driven policies and increase the agricultural R& D spending, which will ultimately facilitate the producers in decreasing the cost of production and increase yield per hectare and output quality.
- The allocated funds on Research and Development (like Rs. 194 billion) should be disbursed after discussions with the relevant stakeholders through a Joint Coordination Committee (JCC) comprising of leading agricultural businessmen, farmers and small landholders' representatives, academic researchers, and banking sector. The JCC should monitor and share the performance with the concerned authorities to ensure optimal and clean transfer of allocated funds, keeping in view the potential for agricultural development under CPEC. The JCC will also address structural challenges and play role as a facilitator and a developmental partner for other research institutions (UAF, AARI, NIAB, NIBGE, NARC, PARB, etc.) to accelerate the development of agriculture in Pakistan.
- Agricultural research institutes should focus on China's agricultural practices, technology and post-harvest practices, and implement them in domestic farms in order to improve crop output quality and yield, as per the 'Vision 2025' discussed in chapter four.
- To minimize the yield gap with developing countries, for example the 60% yield gap which exists in wheat, the research agencies should focus on the main reasons for low productivity and instability in yield (delayed harvesting of kharif crops like cotton, sugarcane and rice, and consequent late planting of wheat, non-availability of inputs like certified seeds, inefficient fertilizer use, weeds infestation, shortage of irrigation water, terminal heat and drought, soil degradation, and weak extension services system).
- Ministry of Food and Agriculture Islamabad may be requested to seek technical advice to minimize the Technical Barriers to Trade (TBT) through consultation with China's Ministry of Agriculture, to increase production, yield and exports as well of the major cash crops of Pakistan.
- Approximately 75 percent of the farming community comprises on small land holders, who are practicing agriculture not as a profession but as a way of life. GOP should structure the agricultural marketing framework in a way which facilitates small growers; helping them to introduce their produce in those structured markets.
- There is also a need to improve the Supply Chain Management (SCM) practices for those crops, vegetables, and food products that can be exported to Chinese markets through CPEC. We can save billions of rupees nationally by adopting modern handling, storage, processing, transportation, and marketing practices as per the advice of ISO to minimize post-harvest losses. For example, Rice post-harvest losses (14-16%) in Pakistan can be reduced by up to 30% through the use of modern SCM practices.
- The availability of innovative farm machinery should be ensured, by import without duty from China and other countries. The resulting increase in the use of modern technology in domestic farms will save time and cost of domestic producers. For example, by using rice harvesters, silo technology, rice growers, cotton pickers, combine harvesters etc. a huge amount of resources can be saved and the usage of arable land can be increased. The use of this technology will cause a positive socioeconomic and critical mass effect in agricultural communities.

- To ensure awareness programs about China's practices including trainings sessions for proper harvesting techniques and methods that will increase the profitability and responsiveness of growers and eliminate the social and cultural differences.
- The storage capacity at the export point should be enhanced as per international SOPs, which can help in saving up to 4-6 percent post-harvest loss of the producers annually.
- State Bank of Pakistan (SBP) needs to design better agricultural finance policies, increase dedicated human resources, simplify lending procedures, remove the bias against small landholders, rationalize lending rates, work diligently for creating mass awareness, and develop other prerequisites to ensure timely provision of credit to farmers and harness the vast untapped potential of agricultural credit demand.
- To strengthen dairy, meat based products sector due to their high profitability and export potential, by encouraging private sector involvement in these sectors. China is facing deficits in the domestic production and consumption of dairy and meat products, which provides an opportunity for Pakistan to take a huge share in the Chinese markets by introducing HACCP and SPS standards based value added dairy and meat products. The government should establish an independent Milk Board with representation from all sectors of the dairy industry which would design and execute an export policy throughout the dairy sector.
- To ensure bulk water storage reservoirs for fulfillment of irrigation requirement. Since 1982 to 2002, the irrigated area has increased from 15.48 to 18.22 million hectares. The shortage of irrigation water at crown root initiation, booting and early grain fill period results in significant yield losses.
- To adopt modern irrigation techniques such as drip irrigation, and minimize flood irrigation up to some extent, which will help to reduce wastage of irrigation water.
- To promote Good Agricultural Practices (GAP) and environment friendly practices in agriculture in order to prevent the wastage of natural resources and achieve sustainable growth in the agriculture sector, keeping in view the alarming situation of climate change and global warming. Currently, 1 kg of Export Quality Rice produced in Pakistan, uses around 3000 to 5000 liters of water, which needs to be addressed on an urgent basis, given the projected shortage of freshwater in Pakistan in the near future.

Conclusion:

Many Asian countries including China, India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam are giving high priority to innovative agriculture and plant biotechnology research in the expectation of addressing the challenges linked to improving agricultural productivity, farmers' livelihoods, rural prosperity, and ensuring national food security. Many of these countries, through their focus on innovation and research, have achieved better yields and quality of food crops, non-food crops, and crops of high commercial value while reducing the use of pesticides and alleviating poverty in the rural areas. Now, the GOP should design policy initiatives under the theme of "CPEC Agricultural Vision 2025" to bring sustainable growth in domestic agriculture through the CPEC project and an increased emphasis on innovation and technological advancement. This will surely help in boosting the growth of the agriculture sector and making CPEC a 'game changer' for Pakistan's economy.



APPENDIX -I

CONVERSION FACTORS

<u>Weights</u>			
One pound (16. Oz)	=	0.45359 Kgs	= 0.48609 Seer.
One hundred weight (112 lbs)	=	50.80208 Kgs	= 1.361 Maunds.
One ton (2240 lbs)	=	1.01605 M.tons	= 27.22 Maunds.
			= 5.60/5.71 bales
			= of jute/cotton
One tonne	=	0.984 Tons	= 26.792 Maunds.
Cotton bale (375 Lbs)	=	170.09 Kgs	= 4.5571 Maunds
			= 0.1674 Long ton
1 Bushel per acre	=	67.253 Kgs. per hectare	
1 Bushel = 0.73 Maund.			
	=	29.17 Seers.	
	=	60.00 Lbs.	
<u>Length</u>			
One inch	=	25.3999 Millimeters	
One foot (12 inches)	=	0.3048 Meter	
One yard (3 feet)	=	0.9144 Meter	
One mile (1760 yards)	=	1.60934 Kilometers	
<u>Square Measures</u>			
One square yard	=	Nine Square Feet	= 0.83613 Square Meter
One acre	=	4840 Square Yards	= 0.40468 Hectares
One square mile	=	640 Acres	= 258.99842 Hectare
One square kilometer	=	0.3861 Square Mile	
One Hectare			= 2.4711 Acres
One Cubic Meter			= 2.4711 Acres/ (35.3147 Cubic Feet)
<u>Liquid</u>			
One imperial gallon	=	4.5461 litres or 1.2 U.S gallons	
One U.S. gallon	=	3.7853 litres.	

GENERAL OBSERVATIONS

Divide	By Factor	To obtain
Acres	2.4711	Hectares
Long ton	0.9842	M.tons
Cotton bales (375 lbs)	5.973	Long tons
Cotton bales (375 lbs)	5.879	M.tons
Maunds	26.79	M.tons
Price per 40 kgs.	1.0716	Price/maund
Yield kgs per hect.	92.2313	Yield maunds/acre.
Rice	0.666	Paddy
Cotton Lint	0.333	Seed Cotton

N.B.- In case of vice-versa multiply with the factor.

Source: Agricultural Statistics of Pakistan

APPENDIX -II

Textiles & Clothing Exports from Pakistan with average unit Price (July- February 2016-17)

NO.	COMMODITIES	JULY-FEBRUARY		%
		2016-17 EXPORT	2015-16 EXPORT	
	TEXTILE & CLOTHING ETC.	8,214,007	8,359,230	(1.74)
		8,214,007	8,359,230	
i)	RAW COTTON			
	Qty. M.T.	22,319	47,899	(53.40)
	Value	37,762	74,430	(49.27)
	A.U.P. per M.T.	1,691.92	1,553.89	8.88
ii)	COTTON CARDED OR COMBED			
	Qty.000 K.G.	237	127	86.61
	Value	239	122	95.90
	A.U.P. per K.G.	1.01	0.96	4.98
iii)	YARN			
	Value	856,588	919,334	(6.83)
		856,588	919,334	
a)	COTTON YARN			
	Qty.000 K.G.	307,315	295,810	3.89
	Value	841,221	896,287	(6.14)
	A.U.P. per K.G.	2.74	3.03	(9.66)
b)	YARN OTHER THAN COTTON YARN			
	Value	15,367	23,047	(33.32)
iv)	COTTON FABRICS			
	Qty. 000 Sq.M	1,260,905	1,468,904	(14.16)
	Value	1,392,500	1,485,551	(6.26)
	A.U.P. per Sq.M.	1.10	1.01	9.20
v)	GARMENTS	3,060,273	3,009,184	1.70
		3,060,273	3,009,184	
a)	READYMADE GARMENTS			
	Qty. 000 DOZ	21,838	21,137	3.32
	Value	1,499,131	1,437,265	4.30
	A.U.P. PER. DOZ	68.65	68.00	0.96
b)	KNITWEAR (HOSIERY)			
	Qty. 000 DOZ	78,481	76,885	2.08
	Value	1,561,142	1,571,919	(0.69)
	A.U.P. PER. DOZ	19.89	20.45	(2.71)
vi)	MADE-UPS	426,661	421,208	1.29
		426,661	421,208	
a)	MADE-UPS (Towels & Bed Ware)			
	Value	426,661	421,208	1.29
b)	BED WARE			
	Qty. 000 K.G.	234,564	215,301	8.95
	Value	1,405,209	1,337,427	5.07

Source: Trade Development Authority of Pakistan (2015-16)






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